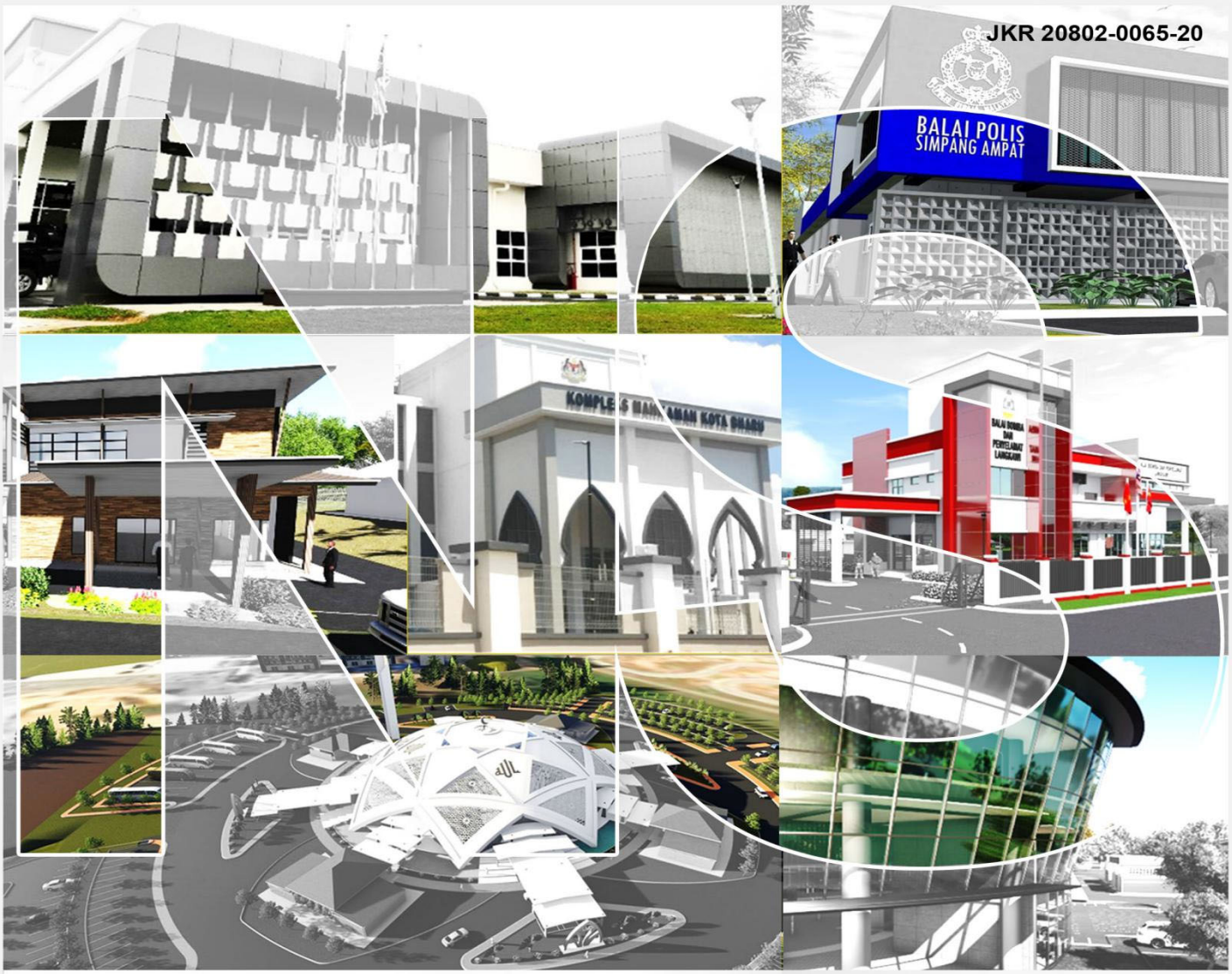

ARCHITECTURAL NEEDS STATEMENT 2020

(for BUILDING INFORMATION MODELLING PROJECT)

CAWANGAN ARKITEK, IBU PEJABAT JKR MALAYSIA
MENARA TUN ISMAIL MOHAMED ALI, JALAN RAJA LAUT
50350 KUALA LUMPUR

ARCHITECTURAL NEEDS STATEMENT
(for BUILDING INFORMATION MODELLING PROJECT)
2020

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MENARA TUN ISMAIL MOHAMED ALI, JALAN RAJA LAUT,
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SECTION 1.0: GENERAL

1.1 The Architectural Works Brief as given shall be for the design, construction, completion, commissioning, handing-over and maintenance of building works for the said project. (Project name and location refer ***Appendix 1 – Project Brief***).

1.2 The Architectural Works Brief shall be read in conjunction with the Civil & Structural Works Brief, Mechanical Works Brief, Electrical Works Brief, JKR Standard Specification for Building Works), Needs Statement for Total Assets Management and all other requirements, of which together shall form the Government Needs Statement for the project. The Tenderer shall execute the project using Building Information Modelling (BIM) methodology. The scope of works related to JKR BIM Requirement shall be referred to **Section 12**. All design and building works requirements specified in the needs statement shall be coordinated and integrated thoroughly in order to achieve an overall design proposal that is cohesive and harmonious in character.

1.3 All architectural requirements pertaining to the design, specifications, construction, equipping, completion and commissioning of the project shall be carried out in accordance with the best commercial and engineering practice and shall comply with the **LATEST** stipulated Government Circulars, Standards, Guidelines, Acts & Regulations. Where stringent requirement for security and safety shall be required, reference shall be made to the *Garis Panduan Jabatan Keselamatan Negara* and to other international accreditation body or standards.

1.4 The Conceptual Design BIM Models and Drawings as attached in ***Appendix 2a – Conceptual Design Models and Drawing*** (wherever applicable) of this Pre-Bid document shall only be a guide for the tenderers in submitting the actual design proposal for this project. The Design Models and Drawings shall be referred to as a guide for the minimum standard and requirements of the government. Further improvements and refinements to the said concept design are highly expected from the tenderers and they shall comply with all the design requirements as stipulated in the Pre-Bid document.

1.5 The tenderers shall appoint an Architect registered with Ministry of Finance Malaysia (MOF) and Board of Architect Malaysia (LAM) with experience in the specific area as required by the government. Copies of valid certificate of registration that shows the name and registration date shall be included in the submission.

1.6 The consultant architect's appointment shall include the design, supervision and certification of works during the construction period as well as during the defects liability period as described further in the government brief. The consultant shall have an adequate and qualified team of design and supervisory staff on site.

1.7 Where it is required, the tenderer shall also appoint specialist and other consultants such as Town Planner, Landscape Architect, Interior Designer, Medical Planner, Laboratory Specialist and Acoustic Specialist as may be required by the local authority and by the government.

1.8 Refer to ***Appendix 1 – Project Brief*** for the designated site in terms of location, approximate site area and description of site conditions.

1.9 All tenderers shall visit the site to understand the actual conditions of the site locality and evaluate its strengths, weaknesses, opportunities and constraints for design decisions. Any claims on the grounds of lack of knowledge of any off-site or site condition, shall not be considered.

1.10 The successful tenderer shall undertake pre-computation surveys by licensed land surveyor to confirm the site boundaries and shall be endorsed by *Ketua Pengarah Tanah dan Galian* (KPTG / PTG) for projects in West Malaysia. As for projects in Sabah and Sarawak, references shall be made to the respective local authority. The successful tenderer shall also undertake complete engineering surveys, indicating the existing topography, structures, vegetation, and relevant services within and outside the boundaries.

1.11 The successful tenderer shall provide the demarcations of the exact site boundary, as well as all other boundaries separating the zones within the site. This exercise shall be verified by KPTG/PTG or by the approving local authority.

1.12 The successful tenderer shall verify with the approving local authority on the planning guidelines of the proposed site. Planning guidelines such as plot-ratio, maximum height, usable plinth area and other corresponding guidelines shall be adhered accordingly.

1.13 The overall design shall be flexible in usage and allow for future expansion or extension within the site.

1.14 The successful tenderer shall conduct an assessment using the green rating tools to evaluate the level of sustainability achieved for the project as accordance to *Surat Arahan KPKR Bil.2/2020: Pelaksanaan Penarafan Bagi Projek Jabatan Kerja Raya Malaysia (JKR).*

1.15 The successful tenderer shall provide everything necessary for the proper execution of the BIM works until its completion according to the true intent and meaning of the Contract taken together whether the same may or may not be particularly shown or described provided the same can be reasonably inferred therefrom.

SECTION 2.0: SCOPE OF WORKS

2.1 The architectural works shall consist of design, planning, preparation, coordination and development of design models, drawings and specifications and the subsequent implementation, construction (including supervision by qualified professionals), completion, commissioning, handing-over in approved condition and maintenance of the said project which shall consist of, but not be limited to the following components as specified in the ***project brief.***

2.2 The detailed requirements for Building Works shall be laid out in ***Appendix 1 – Project Brief***. The requirements given shall be indicative but not exhaustive, and the tenderers shall include suggestions and/or improvements in their proposals.

2.3 The description of the Scope of Works Related to BIM in the project are as per stated in ***Appendix 13 – BIM Brief***.

2.4 All information provided in the pre-bid document shall be with intention to assist the tenderers in the design and shall not be read as the only features or facilities required and/or being a constraint to the design. The tenderers shall understand the intended purpose and function of each area and shall be responsible to provide a complete design and build facilities for the proper function and efficient operation intended for each area.

SECTION 3.0: SCHEDULE OF ACCOMMODATION (SOA)

3.1 The tenderers shall prepare a detailed Schedule of Accommodation based on the requirements outlined in the Project Brief ***(Appendix 2 – Schedule of Accommodation)*.** As for detailed Schedule of Accommodation of scope related to **Scope of BIM Works** (refer to **Appendix 13**), shall be generated from the design model. The brief indicates the number of rooms required, estimated space area and the rooms' functions, which shall serve as a guide for the tenderers to develop proper working and detailed drawings.

3.2 The tenderers shall follow as closely as possible, the space and building requirements in the brief. Where the size of a room / area has not been specified, the tenderers shall propose appropriate and adequate sizing for the proper functioning of that room / area. Any deviation to the requirements shall be to the concurrence of the PD and approval of the client.

3.3 The tenderers shall comply with the *Garis Panduan Dan Peraturan Bagi Perancangan Bangunan* by *Jawatankuasa Standard Dan Kos, Unit Perancang Ekonomi (EPU), Jabatan Perdana Menteri*, Malaysia.

3.4 The tenderers shall propose the gross areas for each of the functional spaces required. The tenderers may include in the proposal; own suggestions, new ideas and/or improvements on all aspects of design, construction and the finished materials used, in accordance with their best professional judgement in fulfilling the requirements of the Needs Statement.

3.5 The tenderers shall allow adequate spaces and/or room for circulation, mechanical and electrical requirements and installations, and any other space requirements that are not mention on the schedule or not shown on the concept drawings.

3.6 The tenderers shall ensure the spaces provided fulfill the functional requirement in the project brief and of the building. The successful tenderer shall bear all costs for any inadequacy of the spaces proposed for the said project.

SECTION 4.0: ARCHITECTURAL DESIGN GUIDELINES

4.1 GENERAL PLANNING

4.1.1 The overall design and planning of the project shall incorporate all the required buildings and facilities specified in the project brief and shall reflect the operational policies of the building occupant as stipulated in Client's Brief of Requirement (CBOR).

4.1.2 The building shall be designed to suit the site conditions i.e. hilly area, swamp areas, coastal areas etc. The design shall maintain the natural hilly terrain as much as possible. Cutting the slopes for the preparation of infrastructure and building works on hilly terrain shall be in accordance to the latest *Garis Panduan Perancangan Pembangunan Di Kawasan Bukit Dan Tanah Tinggi* by *Kementerian Perumahan Dan Kerajaan Tempatan* (KPKT) and the latest other related guidelines for coastal, swamp and mangrove areas.

4.1.3 The building design and orientation shall maximize passive design strategies.

4.1.4 The design shall be innovative yet able to blend with local context, flexible in usage and with minimal maintenance. All building façade design in the project shall have a unified and harmonious character to the government's requirement.

4.1.5 The overall design shall meet the spatial and functional requirements of the project brief and must allow for future expansion or extensions within the development. The masterplan shall be of flexible design to accommodate future expansion, if required in the Client's Brief of Requirement (CBOR).

4.1.6 All areas shall be designed to achieve good cross ventilation and natural lighting. Any deep planning design shall be avoided or otherwise, internal courtyards for ventilation and natural lighting or mechanical ventilation system shall be provided.

4.1.7 Mosque, *surau* or prayer rooms shall be orientated to the *Qiblat* (direction of prayer), accessible to OKU and segregated between genders. Ablution facilities shall be attached/annexed and has a direct entrance to these praying areas. Mosque, *surau* or prayer rooms and ablution facilities design shall comply with MS 2577: 2014 Architecture and Asset Management of Masjid - Code of Practice.

4.1.8 All halls, training facilities, auditorium, conference room, indoor shooting range, hangar, studios, mosque, *surau* and other related rooms/areas of similar nature shall be designed column-free and without any obstruction of view.

4.1.9 Minimum floor to ceiling height clearance shall be 3000 mm. The height of basement, if provided, shall not be less than 2500 mm clear height. All public spaces shall have a minimum floor to ceiling height clearance of 3000 mm inclusive the underside of beam.

4.1.10 Internal rooms for habitable usage shall be avoided**.**

4.1.11 Storage buildings and storage rooms shall be functional and well ventilated to avoid dampness and in compliance to *Jabatan Bomba dan Penyelamat* (JBPM) and UBBL requirements.

4.1.12 The successful tenderer shall responsible to ensure the design and positioning of the building services conduits are given due consideration during the design and construction stages.

4.1.13 The successful tenderer shall fulfill all the requirements of Chief Government Security Office (CGSO Malaysia) regarding security protection to ensure the safety and security are up to the appropriate level of the proposed building. All requirements shall be reflected in overall design and planning in compliance with CGSO Malaysia.

4.2 SUSTAINABLE DESIGN

4.2.1 The building shall be designed to the extent possible with reduction of fossil fuel used, water efficiency and sustainable materials.

4.2.2 The successful tenderer shall plan, design and construct the building by taking into consideration the following, but not limited to:

a) Catering for cultural diversity of the building usage
b) Effective space planning for usage and maintenance
c) Ease of maintenance including accessibility for maintenance purpose
d) Security and safety
e) Comfort and ergonomic
f) Design for all (universal design)

g) Good indoor and outdoor environment qualities
h) Sustainable building, energy efficient and fulfil water tightness condition
i) Maintainability, serviceability and accessibility
j) Operational efficiency completed facility
k) Life cycle cost (Costs of Ownership)
l) Functionality

4.2.3 **Energy Efficiency (EE)**

The successful tenderer shall plan, design and construct the building to be able to provide a significant reduction of the energy need for cooling and lighting, independently of the energy and of the equipments that will be chosen to cool and illuminate the building by taking into consideration the following, but not limited to:

a) Office buildings design shall comply to the latest edition MS 1525: 2019 Code of Practice on Energy Efficiency and Use of Renewable Energy for Non-Residential Buildings, By-Law 38A of UBBL 1984 Energy Efficiency in Buildings and Daylighting Design Guidelines for Office Buildings in Malaysia, JKR 2012.
b) The building shall incorporate features of energy efficient building, meeting all regulatory requirements, and occupant comfort levels.

4.2.4 **Passive design strategies**

Passive design strategies through creativity, innovation and varying envelope components need to be implemented. This effort will give high impact reduction and low operational cost in building's energy consumption. Energy efficient design criteria are as below but not limited to :-

a) Site Planning and Building Orientation
b) Building Façade Design to reduce heat gain to the building
c) Maximise use of day Lighting and glare control
d) Optional design for Natural Ventilation
e) Strategic Landscaping
f) Future Considerations for Maintenance and expansion
g) Green Building Materials

4.3 ENVIRONMENTAL REQUIREMENT

4.3.1 All environmental requirements shall be read in conjunction with the Environment & Energy Efficiency Brief and in compliance with MS ISO 14001: 2015 – Environmental Management Systems.

4.3.2 Rainwater shall be harvested for general washing and landscape irrigation.

4.4 PRESERVATION OF TREES

4.4.1 The successful tenderer shall survey and preserve any matured trees as stated in Town and Country Planning Act 1976 (Act 172), Section 35A. The inventory shall be addressed in the Planning Approval Submission.

4.4.2 Identified mature trees that approved by the local authorities shall be conserved (retained) or relocated as stipulated in the act or relevant guideline by local authority.

4.5 TRAFFIC MANAGEMENT

4.5.1 The traffic management requirements and needs shall be read in conjunction with the Civil Engineering Works Brief.

4.5.2 Wherever it is required, the successful tenderer shall consider the traffic management strategy around/to the building in compliance with the relevant local authorities. The traffic shall maintain a smooth flow and not causing long periods of idle standing, as to minimize congestion and pollution.

4.6 COMPLIANCE WITH DISABLED REQUIREMENT

4.6.1 All building design shall take into account the accessibility for disabled persons and shall comply with the ByLaw 34A of UBBL 1984 Amendment 2012 and MS 1184: 2014 Universal Design and Accessibility in Built Environment – Code of Practice which all buildings and facilities shall be provided with access to enable the disabled to get into, out of and within building. It shall be designed with facilities for disable people's usage.

4.7 COMMON AMENITIES

4.7.1 Adequate number of common amenities/facilities such as the following, shall be provided in accordance with the local authority's requirements and located at suitable and accessible locations:

a) Common Toilets
b) Refuse bin facilities
c) Recycle bin areas
d) Parking lots (car, motorcycle, bicycle and/or bus)

4.7.2 The public toilets shall be near the public areas but isolated from the sight and the design shall be accordance to MS 2015-1:2017 Public Toilet Part 1: Design Criteria.

4.7.3 The successful tenderer shall provide vending machine power point and water outlet at approved locations where it is required.

4.7.4 Refuse bin facility shall be provided according to the authorities' requirements and approval. Refuse bin facility shall be design with roof coverings, water tap, light fittings, discharge points and proper ventilation.

4.7.5 Recycle bin area shall also be provided at strategic points and shall be sheltered from weather elements.

4.8 EXTERNAL WORKS DESIGN

4.8.1 Anti-climb perimeter fencing shall be provided where security aspects is vital to the nature of the building. The minimum height shall be 2400 mm anti-climb hot dipped galvanized security fence with minimum 300mm height concrete base and 300mm height Y barb tape.

4.8.2 G.I. mesh security perimeter fencing and gates of approved design and standards shall be provided. The minimum height of the perimeter fencing shall be at least 2100mm with minimum 150mm height from ground level.

4.8.3 Decorative fencing of 2400mm of minimum height shall be provided at the road frontage where the main entrance gate is located. The design of the decorative fence shall complement the design of the guardhouse and the gate.

4.8.4 A reasonable number and size of flagpoles shall be proposed to PD's concurrence where required. It shall be erected in a prominent area e.g. main porch or plaza. Poles shall be stainless steel or of equivalent non-corrosive materials.

4.8.5 Drive-through covered porch designs shall be provided at the main entrance of the buildings and all other location as required. The design and details of the porch and link ways shall be coordinated with the main building link ways. It shall be designed to harmonize with overall building planning.

4.8.6 Covered walkways shall be provided with adequate roof overhang design (minimum 1500mm) and all walkways floor shall be finished with non-slip

finishing materials, flush, level and complete with proper drainage. All level drops and steps shall be accompanied by ramps of suitable gradient.

4.8.7 All detailing for link ways, walkways, gratings and ramps shall be suitable for the disabled, wheelchair users, and trolley movement in accordance with MS 1184: 2014 Universal Design and Accessibility in Built Environment – Code of Practice.

4.8.8 All drains and sumps located at the gathering area, along main pedestrian walkways and near public areas shall be completely covered or concealed for safety reasons and aesthetic.

4.8.9 Open corridors shall integrate scupper drain and adequate water outlet / concealed downpipe and shall be aesthetically integrated with the overall facade design.

4.8.10 Non-suspended concrete aprons, if provided, shall be of a minimum width of 1200mm and shall be detached from the structure of the building.

4.8.11 Concealed perimeter drains shall be provided with accessible openings at every 3000mm intervals. These openings shall be covered with galvanized heavy duty steel grating or precast concrete slabs with appropriate finishes and secured to the base.

4.8.12 All security and safety aspects including TNB block and Sewerage treatment plant shall be in compliance with local authorities' requirements.

4.9 INDUSTRIALISED BUILDING SYSTEM (IBS)

4.9.1 The project shall be implemented using the Industrialized Building System (IBS), unless otherwise specified.

4.9.2 The project shall comply with *1Pekeliling Perbendaharaan PK1.1/Perenggan 6 (viii).* The tenderers shall use IBS construction methods to achieve minimum overall IBS Score of 70%.

4.9.3 The IBS score for architectural works shall be calculated using The Manual for IBS Content Scoring System (IBS SCORE), published by Construction Industry Development Board (CIDB). IBS Score for architectural works shall be submitted together with the Tenderer's Proposal.

4.9.4 The proposed building construction systems shall be flexible-to- change without compromising the quality and the systems. The system shall be able to incorporate the usage of local materials and utilizing local labour as per local authorities' requirement.

4.9.5 Architectural IBS Component:

a) The design of the building, its elements and component shall comply with the Malaysia Standard MS1064:2001 'Guide to Modular Coordination in Buildings' or the latest edition.

b) The successful tenderer shall be responsible to ensure that the design and the positioning of the building services conduits are taken into consideration during the design as well as the manufacturing processes.

c) All structural components inclusive of wall panels and floor slabs shall take into consideration the ultimate load and requirements of mechanical and electrical equipment in the design.

d) All jointing designed for the components shall be treated properly in relation to water tightness as well as aesthetics.

4.10 WARRANTY OR GUARANTEE

4.10.1 The terms and conditions for all warranty / guarantee shall be subject to the PD's concurrence and to the respective material accordingly.

4.11 DESIGN CONSIDERATIONS FOR MECHANICAL AND ELECTRICAL (M&E) REQUIREMENTS

4.11.1 The details of M&E requirements, shall be read in conjunction with the M&E Works Brief, of this tender document.

4.11.2 Adequate spaces shall be provided for M&E plant rooms, Air Handling Unit (AHU) rooms, electrical switch rooms, substations, sub switch rooms and other M&E requirements, that shall be necessary for the function of the building. Adequate space above ceiling shall be provided, to accommodate all service conduits, ducting and piping for installation and maintenance purposes.

4.11.3 All amenities, services and equipment rooms shall be efficiently designed with stack-able layouts and shall be accessible.

4.11.4 Internal service rooms shall be avoided, and if there are any, some form of mechanical ventilation system shall be provided.

4.11.5 All sub-main switchboards and distribution boards for M&E services shall be concealed or hidden in appropriate locations, so as not to interfere with the architectural or interior design works. Decorative compartments or panels shall be provided to overcome the problem.

4.11.6 All piped services, risers and cable ducts shall be concealed if it lay through the walls or ceiling. All exposed services / ducts shall be adequately boxed up and concealed and blend in with the interior design.

4.11.7 All mechanical areas shall have 50 mm drop finished floor level relative to adjacent areas, complete with adequate number of stainless steel floor traps.

4.11.8 All electrical areas finish floor level shall be raised 50 mm relative to adjacent areas.

4.11.9 All services and equipment rooms shall be adequately ventilated and protected from weather elements. The walls shall either be tiled or plastered and painted with acrylic paint or other approved alternative finish for easy maintenance.

4.11.10 Conduits, services pipe and cable ducts shall be concealed for aesthetic and security reasons. Access shall be provided for maintenance purposes. Cable access for all necessary electrical rooms shall be provided.

4.11.11 AHU rooms, cooling towers, air conditioning condensing units, chiller plant rooms and pump rooms shall not be located adjacent to the noise sensitive spaces such as meeting rooms, discussion rooms or office areas. Effective acoustic treatment shall be provided to satisfy noise level criteria if above conditions cannot be met

4.11.12 A proper staircase shall be provided to service rooms or floors for maintenance.

4.11.13 No manholes/junction box of any services shall be allowed in the circulation areas inside the building, and in the middle of the road.

4.11.14 Riser for electrical, telecommunication and IT services shall be separated from mechanical services especially the water pipes to eliminate risk of electrical short circuit.

4.11.15 AHU rooms shall be air tight (excluding the opening for fresh air intake) and vermin free. The doors shall be double leaf and open outwards. AHU rooms shall not be located next to toilets to prevent the contamination of fresh air intake.

4.11.16 AHU rooms shall be provided with water taps and floor traps for maintenance purpose.

4.11.17 Adequate spaces shall be provided for safe operation and maintenance of M&E machines or equipment. The distance between the machine / equipment shall not be less than 1 meter to allow safe operation and maintenance works to be done.

4.11.18 All hose reels for firefighting shall be compartmentalized with sufficient space for easy access and usage. Such compartments shall not encroach into circulation areas. Floor traps shall be provided inside the compartments for maintenance purpose.

4.11.19 Grease trap, where necessary, shall be installed at the kitchen, food process and preparation areas.

4.11.20 For air-conditioned spaces where condensation will likely to occur the temperature and humidity shall comply with JKR Guidelines on The Prevention of Mold Growth in Buildings

4.11.21 Air conditioning condenser units, where installed, shall be located inconspicuously in an orderly manner, well ventilated and protected from direct sunlight.

4.11.22 Integration to all existing system such as power supply station, IT, telecommunication, building automation system, fire integration system, sewerage, roads but not limited as above; shall include upgrading the existing facilities whenever necessary for the proper, efficient function, operation and safety of the system.

4.11.23 The successful tenderer shall install sub meters of major water usage such as irrigation, cooling towers, at every blocks or tenants in order to monitor water usage and leaks detection. For energy monitoring purposes, sub meters for electrical, water and gases shall be provided at strategic locations (refer to Mechanical & Electrical Works Brief).

4.11.24 Luminaries fittings shall be recessed to reduce dust collection, ease of cleaning and maintenance.

4.12 MAINTENANCE

4.12.1 Considerations for ease of maintenance, servicing and cleaning works shall be emphasized on all building design.

4.12.2 An area for maintenance office shall be provided and easily accessible.

4.12.3 All windows and doors, ceiling, fittings (including M&E fittings and curtains), architecture features etc. at considerable high level shall be provided with appropriate pre-planned mechanism or fixed structures for easy maintenance and cleaning purposes such as built-in motorized devices, scissor-lift / man-lift, catwalks, cat ladders etc.

4.13 SAMPLES AND MOCK-UPS

4.13.1 The successful tenderer shall set up mock-ups and submit samples of all finishes, fittings and accessories complete with colour schemes, where applicable, for PD's concurrence prior to actual installations.

4.13.2 The successful tenderer shall arrange factory / show room visits prior to the production and selection of materials, equipment and/or furniture.

4.13.3 The approved samples of all finishes, fittings and accessories shall be properly mounted on sample boards with labels and shall be placed at the site office for reference.

SECTION 5.0: ARCHITECTURAL COMPONENTS, MATERIAL AND FINISHES

5.1 GENERAL

5.1.1 Architectural components, materials and finishes used for the building shall follow their respective categories as specifically stated in the *Garis Panduan dan Peraturan bagi Perancangan Bangunan oleh Jawatankuasa Standard dan Kos, Unit Perancang Ekonomi (EPU).*

5.1.2 Materials and construction methods in a coastal environment or close to water body should be resistant to flood and wind damage, wind-driven rain, corrosion, moisture, and decay (due to sunlight, aging, insects, chemicals, temperature or others factors) and shall comply with *Garis Panduan Perancangan Pemuliharan dan Pembangunan Kawasan Sensitif Alam Sekitar PLAN Malaysia 2017*, Guidelines on Physical Development Planning for Island and Marine Parks Plan Malaysia 2014 and *Garis Panduan Pembangunan Persisiran Pantai JKR 2020.*

5.1.3 A detailed Schedules of Internal and External Finishes shall be drawn up and submitted as part of the proposal as shown in ***Appendix 3 - Schedule of Internal and External Finishes.*** The specifications shall only be indicative and not exhaustive.

5.1.4 Size, texture, colour, pattern and other subjective aspects of materials and finishes shall be subject to PD's concurrence and client's approval.

5.1.5 Anti-termite treatment shall be carried out above and underground prior to construction in accordance with the manufacturer's instruction, by a licensed applicator as specified in the JKR Standards Specification for Building Works.

5.2 ROOF COMPONENTS

5.2.1 The roof design and materials shall have absolute water tightness. The method of installation, fixing and fastening of roofing materials, caps, flashings, insulation and expansion joints, whenever required, shall strictly conform to the manufacturer's specification and installation method.

5.2.2 All roofing works and heat insulation specifications shall comply with JKR Standards Specification for Building Works.

5.2.3 Reinforced concrete flat roof design is not allowed. If unavoidable, reinforced concrete flat roof shall be designed with double roofing where metal deck or other approved materials shall act as primary roof covering above the reinforced concrete slab to prevent leakage and water ponding.

5.2.4 Covered porch design shall be extended to the lay-by and adjacent lane for main building entrance or other locations as required in Client's Brief of Requirement. Covered porch shall also be provided to all residential quarters and hostel (if any). The porch design shall be integrated with the building facade.

5.2.5 Gutters and Rain Water Down Pipe (RWDP):

a) All roof drainage system shall be completed with roof accessories including gutters, debris strainers and RWDP with bracing. RWDP bracing shall be installed to sustain vibration from rapid water flow.
b) Placement of gutters and RWDP shall be aesthetically integrated into the overall facade design or concealed.
c) All rainwater goods specification shall comply with JKR Standards Specification for Building Works.
d) For large roof areas, RWDP with syphonic system shall be used to accelerate water discharge in accordance with BS 6367: Code of Practice for Drainage of Roofs and Paved Areas.

5.3 CEILING

5.3.1 Ceilings specification shall comply with the classification of fire spread as stipulated in the 8th Schedule of UBBL 1984.

5.3.2 Ceiling boards shall be asbestos-free.

5.3.3 Suspended grid ceiling system shall be of proprietary system and the construction shall comply with the design requirements for strength, serviceability, stability, performance and durability, as specified in JKR Standard Specification for Building Works.

5.4 WALL AND PARTITION

5.4.1 The type of non-structural wall system shall be constructed according with their intended purposes. The performance of the wall shall comply with the requirements and proper function of that space.

5.4.2 All non-structural wall system construction shall comply with the design requirements for strength, serviceability, stability, performance and durability, as specified in JKR Standard Specification for Building Works.

5.4.3 Cavity wall or double wall shall be provided for 24 hours air-conditioning areas.

5.5 PAINT WORKS

5.5.1 All paints used shall be those supplied by approved manufacturers and to the approval of the PD.

5.5.2 All painting works and warranty given shall comply with the specifications, as specified in JKR Standard Specification for Building Works.

5.5.3 The successful tenderer shall submit three (3) colour schemes, comprising minimum of two (2) elevations and a Schedule of Paint Works for PD's approval. (Refer *Appendix 3a – Schedule of Paint Works*).

5.6 ACOUSTIC WORKS

5.6.1 The successful tenderer shall provide acoustical treatment to the auditorium, lecture rooms, meeting rooms and other required areas to the proper function of the rooms and fit for its purpose.

5.6.2 Samples of all acoustic materials, proposed colour schemes together with detail drawings and performance calculation data endorsed by an acoustic specialist shall be presented for the PD's concurrence prior to installation.

5.6.3 Measurements of the indoor ambient noise levels at the noisiest facade shall be taken. The measurements shall be in accordance with BS EN ISO 140-4 and the acoustic performance shall be rated in accordance with BS EN ISO 717-1.

5.7 WINDOW

5.7.1 Casement windows shall not obstruct or encroach into any circulation area when open.

5.7.2 Adjustable glass louvres windows shall be used where it is required. The adjustable louvres when used shall conform to MS 1057: 1995 Specification for Adjustable Louvre Windows. Glass louvre blades shall not be less than 6 mm thick.

5.7.3 Anodized aluminium curtain and/or blind tracks shall be provided to all windows, as required.

5.7.4 Security grille, as required, shall integrate with the window frame and comply with fire regulations.

5.7.5 All toilet windows, unless otherwise stated, shall be top hung window fixed with translucent glass.

5.7.6 The windows and shading devices design shall be weatherproofed, form an integral system that prevents glare, promotes the transmission of daylight deep into the building and satisfies user requirements for glare protection, view and control of direct daylight transmission into the room.

5.7.7 Window design shall ensure the lux level comply with the MS 1525: 2019 Code of Practice on Energy Efficiency and Use of Renewable Energy for Non-Residential Buildings for the function of internal room and/or spaces without compromising the view to external surrounding.

5.7.8 Vertical or roller blinds complete with all accessories, shall be robust, high quality and easily maintained. Blinds shall be provided for administrative areas, meeting rooms and other appropriate air-conditioned areas, as required unless otherwise specified.

5.7.9 Where any UPVC window frames are specified, all joints shall be completely welded into a single piece for a seamless smooth finish.

5.7.10 Window design shall consider safety and security issues. All top hung and casement windows shall include window opening restrictors.

5.7.11 Double glazed window shall be provided for 24 hours air-conditioned areas to avoid condensation.

5.7.12 A Schedule of Windows shall be drawn up by the tenderers as part of the proposal in ***Appendix 4 - Schedule of Windows and Doors.***

5.7.13 All doors that situated on the ground floor, basement, split level floor and any other locations easily accessible from outside shall be provided with security grilles. If the design of the residential block is susceptible to security breach, security grilles shall be provided for all main entrance doors. All residential block's windows shall be provided with security grills that can be secured without a padlock and easily opened in case of fire emergency. Security grilles shall be designed integrated with the door and/or window frame and in compliance with fire requirements.

5.8 DOORS

5.8.1 All doors unless otherwise specified shall be of hollow core or honeycomb timber construction with 40mm minimum thickness.

5.8.2 External doors shall be protected from weather elements. The doors shall be recess inwards or shielded by eaves or canopies.

5.8.3 Doors at auditoriums, conference room, meeting rooms and all main entrances shall be solid timber or solid core construction with 40mm minimum thickness.

5.8.4 Doors shall not obstruct or encroach into any circulation area when open. Door swing shall comply with fire regulations.

5.8.5 Single leaf door width shall not be less than 900 mm clear opening and double leaf door width shall not be less than 1500 mm clear opening. Door height shall not be less than 2100 mm clear opening and fit for its purpose.

5.8.6 Approved door seals or sweeps shall be provided underneath doors between air-conditioned and non-air-conditioned areas, where applicable.

5.8.7 Composite aluminium louvered doors shall be provided for utility rooms, plant rooms, and all other rooms requiring natural ventilation or fresh air change cycle. For sensitive equipment / instrument rooms, anti-vermin netting shall be fixed and fastened inside the louvered door panels. Sizing shall be appropriate and netting colour shall blend with overall scheme.

5.8.8 Access card system shall be provided wherever it is specified/ required. The location and position of the system shall not jeopardize the architectural aesthetic. (Refer to electrical works brief).

5.8.9 Non-corrosive roller shutter doors or grilles shall be provided at refuse bin facilities and other applicable areas.

5.8.10 Semi or fully glazed sliding automatic doors with electronic controlled if specified, shall be with manual override and shall be provided with side doors for all main entrances. All semi or fully glazed sliding doors, whether automatic or not, shall have adequate space for the doors to slide open unobstructed and safely.

5.8.11 All semi or fully glazed doors shall be disabled-friendly and marked prominently with safety indicators i.e. design, colours, stripe etc.

5.8.12 All fire rated doors and frames must be obtained from a manufacturer approved by the inspectorate of the fire department and installed strictly in accordance with the manufacturer's specification.

5.8.13 All compartmentalized areas where fire door is required shall be provided with magnetic hold-open devices.

5.8.14 A Schedule of Door shall be drawn up by the tenderers as part of the proposal in ***Appendix 4 - Schedule of Windows and Doors.***

5.9 IRONMONGERY

5.9.1 All doors, windows and gates shall be provided with anti-rust heavy-duty ironmongery appropriate for its function, complete with fixing screws of the same material and finish.

5.9.2 All door sets, door closers, floor spring and other door hardware accessories except otherwise specified, shall be supplied by one manufacturer. If various manufacturers are used, the successful tenderer shall coordinate to ensure uniformity.

5.9.3 All double leaf doors and external doors shall be provided with stainless steel, brass or bronze mortise lockset (6-pin), stainless steel lever handle, door closer, door stopper and other required accessories.

5.9.4 All single internal doors (except toilet cubicle doors and sliding doors) shall be provided with stainless steel, brass or bronze cylindrical lockset (6-pin),

stainless steel lever handle, door closer, door stopper and other required accessories.

5.9.5 Toilet cubicle doors shall be fitted with stainless steel indicator locks.

5.9.6 Panic exit device shall be used at all fire exit doors and as required by fire regulations.

5.9.7 All locks shall be master suited / key-alike in each building. All locks shall be furnished with construction keys, differ keys, master keys and grand master keys under the same system.

5.9.8 All locks shall be furnished complete with at least with three (3) keys. All keys shall be high quality brass and nickel silver alloy. Number of differ keys, master keys and grand master keys shall be provided with construction keys.

5.9.9 All differ, master, grand master keys are to be sealed, labeled and handed to the client upon completion of the project in a properly organized manner to the satisfaction and concurrence of the PD.

5.9.10 All lock strikes plate shall be supplied with box. Its lip shall have sufficient length to protect the door trim and jamb.

5.9.11 Tubular knob handles shall not be acceptable for fire doors.

5.9.12 All locks and locksets shall comply with ANSI-European Standard or other recognized standards:

a) Minimum cycle (200 000) test report for the tubular knob and lever set as per ANSI Grade 3 shall be submitted as evidence.
b) The successful tenderer may also submit test reports that conform to ISO 9001 and ISO 143001.

5.9.13 All hinges shall be from the same manufacturer and comply with the JKR Standard Specification for Building Works Unless otherwise specified, stainless steel (304 grade) butt weld hinges of not less than three (3) nos. of hinges per door leaf shall be provided.

5.9.14 Door closers and door stoppers:

a) Door closers and door stoppers shall be of approved locally manufactured type and shall be properly installed and fastened where it shall not obstruct any equipment, furniture and/or services.
b) All doors shall be fitted with aluminium alloy door closers except toilet cubicle doors and sliding doors and shall have hold-open function except for fire doors.
c) Door closer elements such as spring / power setting, back check, sweep speed and latch speed valve shall be adjustable.
d) All toilet cubicle doors shall be fitted with one (1) numbers of stainless steel hook.

5.9.15 All floor springs shall be provided with pressure relief valve to prevent over loading and oil leakage.

5.9.16 Stainless steel push plates, pull plates and kick plates shall be provided at toilet's entrance doors.

5.9.17 The successful tenderer shall pack all hardware items individually in boxes/plastic bags, properly labelled with door number, hardware sets, master keying reference and location of door.

5.9.18 A Schedule of Ironmongery shall be drawn up as part of the proposal as shown in ***Appendix 5 – Schedule of Ironmongery.***

5.9.19 A proper master key system shall be provided if required.

5.10 TOILETS AND WET AREAS

5.10.1 All toilet and wet areas shall be of brickwork or approved proprietary wall system.

5.10.2 The walls of toilet, pantry, kitchen and wet area shall be finished with ceramic tiles up to ceiling height complete with uPVC tile-trims.

5.10.3 Toilets which connect to an air-conditioned space shall have an airlock before entering the toilet.

5.10.4 All toilets which connect to a non-air-conditioned space shall have indirect entrance.

5.10.5 Dimension, requirements and specifications of all toilet including OKU toilet, shower room or bathrooms shall comply with the Malaysian Standards MS1184:Universal Design and Accessibility in Built Environment – Code of Practice.

~~5.10.6~~ Toilets shall have maximum number of windows for good ventilation and daylight, and conform to Uniform Building By-Law 1984 or other equivalent act of Government's Authority.

5.10.7 Toilets shall be designed with water savings flush valve system. The valve shall be concealed and can be easily accessed and maintained.

5.10.8 Toilets with cistern system if required, shall be concealed system that easily accessed, maintained and installed in accordance with manufacturer's instructions.

5.10.9 The side walls of the toilet cubicles shall be brickwork but the entrance doors and front walls shall be an approved proprietary system using water resistant phenolic resin boards. The minimum thickness of the boards shall be 10 mm. The gap between the bottom of the toilet cubicle doors and the finished floor level shall be 100 mm.

5.11 SANITARY WARES AND FITTINGS

5.11.1 All sanitary fittings shall be from approved local manufacturers and shall be securely and properly installed to walls and/or floors complete with connection to waste, vents and services required.

5.11.2 All sanitary fittings shall be water efficient with Water Efficient Product Labelling Scheme (WEPLS) certification and comply with Water Services Industry Act 2006 and Water Services Industry (Water Reticulation and Plumbing) Rules 2014.

5.11.3 The plumbing and sanitary installation shall be completely tested after installation to the satisfaction of the PD. Prior notice shall be given to the parties concerned, prior to testing.

5.11.4 A Schedule of Sanitary Fittings shall be drawn up as part of the proposal for the whole complex as per ***Appendix 6 – Schedule of Sanitary Wares and Fittings.***

5.11.5 **Water Closets (WC):**

a) Wall hung, pedestal and squatting types of WC shall be made of vitreous china.
b) The top of the toilet seat shall be optimized at 460 mm from the finished floor level and comply with MS 1184: 2014 Universal Design and Accessibility in Built Environment – Code of Practice.
c) Each of the WC shall be provided with a controlled bidet fixed on the right side of the wall, complete with stainless steel SUS 304 top cover tissue roll holder, flexible hose with wall hook fittings and a toilet roll holder.
d) Vitreous china urinals shall be provided by client requirement only.
e) All squatting water closets shall have integral footrest and a water seal trap.
f) Except for syphonic system, all other flushing cistern shall be designed in such a way to give dual flushes with a nominal volume of a full and partial flush not exceeding 6 and 3 litres, respectively in accordance with Water Services Industry Act 2006.
g) All fittings shall be of minimum stainless steel SUS 304 unless otherwise specified and to be PD concurrence.

5.11.6 **Wash hand basins and countertops:**

a) All wash hand basins and countertops shall be provided with appropriate sized of mirrors, which shall be fixed flush to the walls.
b) Countertops made of approved solid surface shall have both integral, wash hand basins and 100 mm high back splash or shall have under-counter vitreous china wash hand basins.
c) Taps fixed from the walls, shall be encouraged to prevent mould growth. Pillar taps if specified, shall be properly sealed at the base to prevent water leaking into the countertop.
d) All wash hand basins and countertops shall be fixed at a height between 750 mm to 850 mm measured from finished floor level to the top rim of the bowl with knee clearance for wheelchair access of 650 mm to 700 mm high and 200mm deep with accordance with MS 1184: 2014 Universal Design and Accessibility in Built Environment – Code of PracticeAll wash hand basins and sinks shall have bottle traps and/or other approved alternatives to prevent unwanted smell and for maintenance purposes.

5.12 OTHER FITTINGS

5.12.1 All ablution areas in the Prayer Rooms shall be provided with bib taps, complete with 175 mm long elbow action lever. The ablution areas shall have 1200 mm high stainless steel plates fixed flush with the wall and appropriate stainless steel shelves or ledges. Two (2) floor traps shall be provided to prevent clogging. Allow one space for wheelchair user. (Built-in ablution stool to be provided when necessary /where applicable).

5.12.2 Outdoor areas such as near refuse bin facilities, car wash area, garage and landscape areas shall be provided with special lock-head taps.

5.12.3 Where required, breastfeeding room and nappy changing rooms shall be provided with countertops, sinks complete with washing facilities and adequate number of power point outlets for breastfeeding pumps. Breastfeeding room and nappy changing rooms must be separated for mother's privacy.

5.12.4 A stainless steel shelf, mop hanger, single bowl deep sink and tap fittings shall be provided in all cleaner's or janitor's rooms.

5.12.5 Wherever required, floor traps shall be anti-insect stainless steel type to prevent cockroach egress from waste pipes.

5.13 FLOORS

5.13.1 Floors shall be concrete slab unless otherwise specified and floor finishes are as shown in ***Appendix 3 - Schedule of Internal & and External Finishes.*** All plastering, paving and tiling works shall comply with JKR Standard Specification for Building Works.

5.13.2 All size, pattern and colour of floor finish materials shall be of PD's concurrence and client's approval.

5.13.3 Workstation and computer rooms shall have anti-static floors. Raised floor system, wherever specified, shall have adequate space underneath for pedestal, wiring, cables with cable outlets and electrical openings. The raised floor system shall be flush with the surrounding floor finishes.

5.13.4 All floor areas requiring sports activities shall be constructed and finished with appropriate system and materials that meet sports standards. Outdoor and indoor sport courts shall be finished with sports court surfacing system to PD's concurrence.

5.13.5 All floor skirtings shall be 100mm high unless otherwise specified.

5.13.6 **Vinyl:**

a) Vinyl sheet or vinyl tile flooring shall be of minimum 2mm thick high performance homogenous-heterogeneous type, specified in accordance with the function of the room or area, carried out by specialists from the approved supplier of the material and complies with manufacturer's method of installation.
b) All vinyl joints shall be hot welded.
c) Skirting shall be bent-up of the same vinyl with approved cove former. Skirting shall be finished with matching coloured uPVC capping strips with acrylic adhesive.
d) Vinyl sheet shall be given Polyurethane Reinforced (PUR) surface treatment for easy maintenance.
e) Approved metal dividing clips shall be installed when vinyl flooring meets with other floor finishes.
f) The successful tenderer shall ensure that the floor substrate is even, dry and free from dust prior finishing with vinyl flooring. Vinyl sheets shall be installed onto floor flatness tolerance of not more than ±3 mm for every 3 m length floor area.
g) Low VOC adhesives shall be used.
h) Laying of vinyl flooring shall only be carried out by specialists from the approved supplier of the material.
i) Stainless steel floor traps and/or gratings for vinyl flooring shall be of special approved type that is suitable for vinyl flooring and shall conform to manufacturer's method of installation.
j) Approved anti-slip nosing strips shall be used wherever vinyl is being laid on steps or staircases.
k) To apply approved moisture barrier vinyl sheet underlay for floor with rising dampness moisture content 75%RH.

5.13.7 **Tiles:**

a) All plastering, paving and tiling works shall comply with JKR Standard Specification for Building Works.

b) Tile size shall be minimum 300 mm X 300 mm unless otherwise specified.
c) Shade variation, which is the variation in colour, texture and tone between individual tiles, shall be uniform in appearance.
d) Toilet, pantry, kitchen and other wet area floors shall use non-slip ceramic tiles.
e) Unless otherwise specified, the main entrance and lobby floor areas shall use 600 mm x 600 mm porcelain tiles with water absorption below 3% and/or with granite tiles.
f) Staircases shall be provided with minimum 20 mm wide non-slip homogeneous nosing tiles with bullnose profile, laid full length of the treads.
g) All exposed tile edges shall be rounded off.

5.13.8 **Seamless Flooring System**:

a) All concrete floor slabs shall be applied with waterproofing and floor hardener in accordance with manufacturer's recommendation, prior application of seamless flooring system.
b) High performance, self-levelling epoxy or polyurethane (PU) resin shall be used in areas that are subject to heavy duty machinery and high traffic.
c) Anti-static epoxy resin shall be used in workstation and/or computer rooms unless otherwise specified.
d) Chemical resistant epoxy resin shall be used in laboratories and/or stores unless otherwise specified.
e) Polyurethane resin shall be used in areas that need hygienic clean floors and subject to thermal shocks, such as food preparation areas, cold storage or freezer inside kitchens.
f) Polished concrete wherever specified, shall be super flat concrete floor slab treated with approved coat of nano lithium concrete densifier. It shall be grinded to either 800, 1500 or 3000 grit level (depending on the function) to PD's concurrence prior to the execution of works. Polished concrete shall be low maintenance, waterproof, chemical resistant and with following specification:

i)	Compressive strength	:	63.8 N/mm² (ASTM C942-99)
ii)	Abrasion Resistance	:	70.3 mg weight loss & Wear index at 1000 cycles

			(ASTM D4060)
iii)	Skid Resistance	:	Wet: 62 Dry: 82 (ASTM E303)
iv)	Water absorption	:	4.89 % (BS 1881: Part 122)
v)	Pull out adhesion test	:	967 Psi (ASTM D4541)

g) Coloured stamped or stencilled concrete or any other approved alternatives shall be used at driveways and car porches unless otherwise specified.

5.13.9 Carpet Tiles or broadloom carpet shall be appropriate to the function of areas and shall comply to latest Pekeliling Perbendaharaan Malaysia WP 2.1– Peraturan dan Had Harga Perabot/Kelangkapan Bagi Pejabat Anggota-Anggota Perkhidmatan Awam Persekutuan (Termasuk Anggota Polis Diraja Malaysia).

5.14 WATERPROOFING

5.14.1 Reinforced concrete flat roofs and gutters where applicable, shall use any approved waterproofing.

5.14.2 Wet area floors such as toilets, bathrooms, kitchen and/or pantry where applicable, shall use any of the following types of waterproofing:

5.14.3 Cementitious

5.14.4 Crystallization

5.14.5 Waterproofing for the walls of toilets, bathrooms and/or wet areas shall extend up to 1500 mm.

5.14.6 Damp proof course and/or waterproofing membranes shall be provided to retaining walls, basements and all ground floor areas, especially with finishes such as vinyl, parquet, timber strip and carpet. Damp proof course shall be provided in accordance with approved waterproofing proprietary system.

5.14.7 Waterproofing membrane wherever used, shall be turned up at the curbs, parapets and turned into a sealing chase. Membrane collars and sleeves shall

be provided and properly sealed at pipes and/or conduit areas, in accordance with approved waterproofing proprietary system.

5.14.8 Waterproofing membrane wherever specified, shall reflect and emit heat from the surface and also prevent fungus growth.

5.14.9 All external planter boxes wherever specified, shall be applied with waterproofing complete with concealed proper drainage outlet into the nearest perimeter drain.

5.15 STAIRCASE AND RAILINGS

5.15.1 All external and/or exposed staircases and corridors shall be protected from weather elements to remain dry and not be slippery.

5.15.2 Railings shall be designed 1200mm height for safety, ergonomics and good aesthetics. The design of the safety railings shall be disabled friendly with no obstruction on both sides of the walkway.

5.15.3 Railings of staircases, corridors and/or balconies shall be securely fixed to the floor and shall be of galvanized mild steel, painted with gloss enamel paint unless otherwise specified.

5.15.4 All open balconies, corridors and staircases shall have a proper scupper drain, outlet and down pipe for water discharge.

SECTION 6.0: INTERIOR WORKS, FURNISHING AND OTHER FITTINGS

6.1 GENERAL

6.1.1 Where required, the successful tenderer shall appoint a registered interior design consultant with knowledge, skill and experience both technically and aesthetically to execute all interior design of the building works.

6.1.2 Any interior architectural element or material chosen shall take into consideration towards a healthy and easily maintained. The use and exploitation of all specific and prominent cues of the building interior architectural elements shall be maximised. Simple interior functional parts like appropriate lighting and colours for the wall and floor shall be used to provide aesthetics and to capture the atmosphere desired for each individual space. Interior decoration works shall integrate with the operational and functional requirement, as well as energy performance.

6.1.3 Interior works shall be coordinated with M&E services. The successful tenderer shall comply with all scopes of the interior works as specified.

6.1.4 The interior works for the specified areas shall consist of elements of relevant concept in providing aesthetics and capturing the atmosphere desired for individual space intended.

6.1.5 Interior design material shall comply with fire requirement and ByLaw of UBBL 1984.

6.2 INTERIOR DESIGN CONCEPT AND SCOPE

6.2.1 The successful tenderer shall submit the interior design concept proposal using interior design elements that meets the intended style and theme of the space and function.

6.2.2 The interior design shall provide a conducive, comfortable, user-friendly work surrounding. Interior decoration works shall integrate operational and functional requirements, as well as energy performance in the design.

6.2.3 Detail design models and drawings for the interior design works shall be provided for the whole building. The works shall also include execution, supervision and completion of the areas with special emphasis on the following areas:

a) Main entrance
b) Lobby
c) Reception area
d) Seminar, conference and/or meeting rooms
e) Auditorium
f) Formal living, formal dining and master bedroom for Class A official government residence.
g) Other areas as specified

6.3 GENERAL FURNITURE WORKS

6.3.1 These furniture requirements are for the purpose of design, construction, completion and installation of loose, built in furniture and soft furnishing for all new buildings in the project. The requirements given shall be indicative and non-exhaustive and the successful tenderer may include suggestions and/or improvements:

a) Proper functioning of the rooms shall be ensured with adequate numbers of built-in and loose furniture as required by the client. The design of the furniture shall be of PD's concurrence.
b) Furniture requirements shall be provided as in accordance with government
c) guidelines and circulars.
d) Proposed furniture design and quality shall of PD's concurrence.
e) The dimensions given in the specification are indicative and of minimum sizes. The successful tenderer shall take dimensions on site before fabrication, to ensure the modules can be properly installed.
f) Samples of all furniture items, materials, fabrics and accessories shall be submitted for PD's concurrence prior supply and installation.
g) Mock-up furniture showing design, colour schemes, and samples to be fixed on sample board, fittings and other items shall to be PD's concurrence.
h) When necessary, the successful tenderer shall arrange factory / show room visits to see the production and selection of the furniture.
i) A documented schedule of inventory for all loose and built-in furniture shall be submitted prior to handing over of the project.

j) The proposed furniture system shall be available locally and to the PD's concurrence.

k) Composite wood and other fibre products used shall not contain urea formaldehyde and moisture resistant.

6.4 BUILT-IN FURNITURE

6.4.1 A Schedule of Built-in Furniture **(*Appendix 7 – Schedule of Built-in Furniture*)** shall be drawn up as part of the proposal in the form of all room layouts with elevations of all sides.

a) The successful tenderer shall provide detailed design indicating the length, breadth, height and materials used for the built-in furniture and list out the quantity of the items proposed for each space.

b) All built-in furniture specifications shall comply with JKR Standard Specifications for Building Works.

6.5 LOOSE FURNITURE

6.5.1 All fit-outs and loose furniture shall be supplied and installed to all specified areas.

a) Office spaces shall be furnished with furniture and workstation to PD's concurrence.

b) Head of department's room, officer's room and other required rooms shall be completely furnished and in compliance with latest EPU Guidelines and *Pekeliling Perbendaharaan Malaysia* WP 2.1– *Peraturan dan Had Harga Perabot/Kelangkapan Bagi Pejabat Anggota-Anggota Perkhidmatan Awam Persekutuan (Termasuk Anggota Polis Diraja Malaysia).*

c) Pigeonhole and slotted racks for files shall be provided according to the client's requirement.

d) A Schedule of Loose Furniture & Equipment **(*Appendix 8 – Schedule of Loose Furniture and Equipment*)** shall be drawn up as part of the proposal. The successful tenderer shall also provide indicative furniture design proposal with pictures, catalogues and specifications as to the length, breadth, height and materials used and the quantities of the items proposed.

6.7 LABORATORY FURNITURE

6.7.1 Laboratory furniture for computer lab and chemical lab shall be completed with fittings of adequate quantity and acceptable quality to PD's concurrence.
Laboratory furniture in chemical lab shall have chemical resistant worktop such as epoxy unless otherwise specified.

a) The epoxy resin worktop and fume hood base shall not be less than 20 mm thick, monolithic and moulded from a modified epoxy resin. Work surfaces shall have a smooth and non-glare finish. The worktop shall be installed with a uniform moulded 100 mm high backsplash, 25 mm overhang on the front, exposed ends and shall have a continuous drip groove 3 mm x 3 mm wide on the underside of all exposed edges. All exposed edges shall be finishes with 5 mm radius. Joints in worktops and fume hood base shall be avoided.

b) Laboratory sinks shall be moulded and integral with the epoxy resin worktops complete with moulded 100 mm high backsplash.

c) The laboratory furniture shall come complete with approved proprietary accessories and fittings necessary for the proper functioning of the laboratories.

d) The design and layout of the laboratory furniture shall conform to the requirements of the client.

e) A Shop Drawings of Laboratory Furniture shall be submitted to PD's concurrence and client for approval before installation.

6.8 DESIGN / PERFORMANCE SPECIFICATION

6.8.1 All furniture shall be of good quality, finished and designed with considerations for safety and functionality.

6.8.2 The furniture shall be functional in design, rigid and free from excessive vibration in a variety of layouts and shall have adequate stability against tipping.

6.8.3 The proposed furniture shall be standardized while offering opportunities for reflecting the status and importance of different categories of rooms and personnel. All components shall be designed for easy removal and repositioning. Therefore, it is necessary for all components designed to be interchangeable and reversible.

6.8.4 All proposed materials for furniture shall be appropriate for the intended purpose of the item. i.e. the metalwork specified for the filing cabinets shall be of a suitable thickness to avoid deformation of panels when used for the intended purpose and fully loaded.

6.8.5 All components used shall be safe and shall not possess any harmful materials to the environment. The furniture item shall be formaldehyde free and non-toxic to the indoor environment.

6.8.6 All components of the furniture item shall be either non-flammable or shall not support combustion and shall not emit harmful gases in times of danger from fire. Therefore, the suppliers shall provide to PD a written statement listing all components in either non-flammable or treated-flammable categories. The statement shall also include flammability details of all materials listed in the treated-flammability category in terms of test results from recognized testing authorities with testing certificates.

6.8.7 Furniture components, material and fabrics, containing or during the manufacturing process in which chlorofluorocarbons are used, shall not be accepted.

6.8.8 The furniture shall be capable of being assembled or re-configured with minimum number of tools and minimal time required.

6.8.9 Spare components or parts of the furniture shall be readily available in the market locally.

6.8.10 Ergonomically and psychological factors must be considered in the overall furniture design.

6.9 ARTWORKS AND CARVINGS

6.9.1 Wherever required, selections of artworks and carving materials shall be referred to the Schedule of Artworks and Carvings ***(Appendix 9 – Schedule of Artworks and Carvings)*** and shall be coordinated and in compliance with PD's concurrence.

a) The selected material for artwork and carving shall suit the required location and position. Specifications, samples and fixing of the artworks and carving shall be submitted according to PD's concurrence.

b) The artworks and carving works shall be coordinated with consideration of all architectural finishes, M&E requirements, and maintenance purposes to the PD's concurrence.

c) Where it is required, appropriate paintings or posters shall be provided such as main entrance, lobby, reception area, administrative office and/or other areas. Choice of paintings and posters shall be to the PD's concurrence.

d) The successful tenderer shall also provide colourful murals at approved strategic locations if required by the client.

e) All interior decoration works shall be well coordinated. Samples of all materials and colour schemes together with design models and drawings shall be presented to the PD and the client for approval prior to installation.

6.10 SOFT FURNISHING

6.10.1 Soft furnishing works shall include in the design including installation of curtains and/or draperies.

a) The selected material for curtains and/or draperies shall suit the required location and position. The successful tenderer shall submit specifications and samples to PD's concurrence.

b) The curtains and/or draperies shall consider all architectural and M&E requirements.

c) Blackout curtains shall be provided to specified areas such as the audio visual room, dark room or meeting room to PD's concurrence.

d) Stage curtain shall be provided in multipurpose hall with stage and auditorium complete with M&E and structural requirements.

6.11 SPECIAL FITTINGS AND ACCESSORIES

6.11.1 Selections of special fittings and accessories proposed for the project shall be referred to the Schedule of Fittings & Accessories (***Appendix 10 – Schedule of Fittings and Accessories*****)** and to be coordinated in compliance with PD's concurrence.

a) The selected material for fittings and accessories shall suit the required location and position. The successful tenderer shall submit specifications and samples of the fittings and accessories prior to fixing to PD's concurrence.

b) The fittings and accessories works shall consider all architectural finishes and M&E requirements.

6.12 SIGNAGES AND DIRECTORIES

6.12.1 The material for signage and directories shall suit the required function, location and the availability of the material in the market. The successful tenderer shall submit the specifications and samples of the signage for PD's concurrence.

6.12.2 All external building signage and directories shall be of 3 mm thick aluminium panel fabricate for the body and graphic panel spray-painted with silkscreen finish or sticker cut-out. The signage shall be of corrosion free material and the size of the signage shall be not less than 2100 mm (height) x 1200 mm (width).

6.12.3 All road signage shall be well coordinated and in accordance with *Arahan Teknik* (*Cawangan Jalan*) latest edition.

6.12.4 Selection of interior signage shall be well coordinated to PD's concurrence. A Schedule of Interior signage and directories shall be drawn up as part of the proposal as per ***Appendix 11 – Schedule of Interior Signages*****.**

6.12.5 Signage and directories for main lobby / lobbies of new building as well as renovated existing building shall be well coordinated with the overall concept and place at the eye-level of the visitors It shall be designed high contrast for the visually impaired.

6.12.6 The language used on the signage shall be of client's requirements. Detail information of the buildings and departments designation shall be provided by the client.

6.12.7 All fire and M&E sign shall be of minimum 4mm clear acrylic and spray-painted with silkscreen finish or vinyl graphic sticker cut-out. The size of the signage shall be not less than 58 mm (height) x 250 mm (width) and shall comply with requirements of JBPM. All illuminated signs shall be of translucent graphic films and shall also comply with requirements of JBPM.

6.12.8 All general / door signage, i.e. toilet signs, ablution etc. shall be of minimum 4 mm clear acrylic and spray-painted with silkscreen finish or sticker cut-out. The suitable sizes of the signage shall be proposed by the successful tenderer and to PD's concurrence.

6.12.9 A schedule of exterior signage and directories shall be drawn up as part of the proposal as per ***Appendix 12 – Schedule of Exterior Signage*.**

6.12.10 The signage proposal shall fulfil the following concept:
User and community friendly concept.

a) Enable public to be familiar with the orientation and directions.
b) Sensitive to the needs of the disabled including the blind and the deaf as much as possible.
c) The design of signage shall be integrated and enhance the overall building design.
d) The location of signage must reflect the consistency and continuity from the external environment to the internal environment and easy to read (not too high)

6.12.11 Where applicable, the types of signage to be provided shall comprise of but not be limited to the following:

a) Main entrance signboard and logo (details shall be provided by client with PD's concurrence).
b) External directional signs to be located on roads, parking areas and walkway.
c) Buildings' label *(Blok, Aras & Ruang).*
d) Buildings' main directories.
e) Internal directional signs at strategic locations.

f) Door signs - room titles, numbers, designations and name slots where required (details shall be provided by client with PD's concurrence).
g) Mechanical & Electrical signage (to be coordinated with mechanical and electrical designs).
h) Room codes (as per *asset coding*) to be fixed on left of top door frames or other suitable locations where there are no doors.
i) Floor numbers at lift lobbies and staircases where required.
j) JBPM requirements of signage (e.g. fire exit, fire alarm, etc. shall be coordinated with mechanical and electrical designs).

6.12.12 Pictogram/Symbol of international standard and worded sign shall be provided where required, for immediate impact:

a) Cafeteria
b) Lifts
c) Staircase
d) Male / Female toilet
e) Disable toilet
f) Changing Room
g) Prayer Room
h) Cleaner's Room
i) Breast Feeding Room
j) Nappy Change Room
k) Shower
l) No Smoking

6.12.13 Numbering systems and zoning shall be provided for parking lots.

6.12.14 Residential units shall be provided with external directional signs, block numbers, units' door numbers, mechanical and electrical signage (including JBPM requirements), as well as letter box numbers (if required).

6.12.15 Visual scale shall apply to the signage based on distances, colours used and font types. Consideration shall be given to legibility and contrast to aid the visually impaired visitors.

6.12.16 All signage specifications shall comply with JKR Standard Specifications for Building Works.

SECTION 7.0: LANDSCAPING & TURFING

7.1 All landscaping and turfing works shall comply with JKR Standard Specification for Building Works.

7.2 The landscape works for the whole project shall comprise of both soft and hard landscaping in accordance with the requirements of the local authority and approval of the government.

7.3 Softscape shall comprise of, but not limited to the following; groundcovers, climbers and creepers, shrubs, trees, palms, and turf

7.4 Hardscape shall include, but not limited to the following; Outdoor benches and tables, litter bins, planter box, garden lights, art sculptures, boulders, pebbles and gravels, water features and gazebo (*wakaf*).

7.5 The landscape works shall cover the whole project complex including open parking areas and road sides. All open parking shall be planted with shaded trees. Palm trees are not allowed in the car park.

7.6 The successful tenderer is encouraged to plants shaded trees at building parameter to reduce heat transfer to the building. However, minimum distance between perimeter drain to the tree trunk must according to the Guideline by Local Authority or *Jabatan Landskap Negara.*

7.7 Tree planting at pavement area or footpath shall include root barrier for protection from damage as spell out in the JKR's Standard Specification for Building Works.

7.8 Appropriate landscape design concepts shall be introduced at areas between building blocks and courtyards. Spaces between buildings shall be landscaped or shaded to function as multipurpose outdoor areas as well as to minimize the heat absorption through building envelope.

7.9 Landscape works shall commence twelve (12) months before the project completion date or as agreed by the PD so that the trees and plants are well grown and have fully adapted to the environment when the project is handed over upon completion.

7.10 The successful tenderer shall set up a temporary nursery within the site for cultivating/growing the plants of the said project.

SECTION 8.0: RECREATIONAL FACILITIES

8.1 GENERAL

8.1.1 This section shall be read in conjunction with Client's Brief of Requirement (CBOR)*.*

8.1.2 The dimensions and finishes of the game facilities shall comply with the requirements of the *Garis Panduan dan Peraturan bagi Perancangan Bangunan oleh Jawatankuasa Standard dan Kos*.

8.1.3 All recreational facilities design shall consider safety, security, noise control, central location, orientation, vehicle density and air pollution. Orientation of the outdoor game facilities shall minimize facing the morning and evening sun.

8.1.4 All game court surfaces are to be finished with endorsed and recommended surfacing systems with excellent shock absorption, elasticity, flexibility, strong protective membrane, waterproof, non-toxin, resilience and slip resistance. All sports facilities and courts shall be in compliance with international standards and approved by the respective sports council.

8.1.5 Children's indoor and outdoor playground structures shall be constructed of sturdy, durable, UV stabilized plastic polymers and galvanized steel/aluminium posts with non-toxic coatings and suitable for prolonged outdoor exposure.

a) Stainless steel hardware shall be used. Decks shall be of non-slip surfaces.
b) All swings shall be provided with PVC coated galvanized swing chains and slash-proof rubber seats.
c) All play structures and independent play events shall be in visually stimulating bright primary colours.
d) All playgrounds shall have fall-absorbing surfaces to help protect against injuries due to falls. These surfaces shall be continuous and link all the play equipment's together.
e) Proposed playgrounds shall not be vandalism prone.
f) Playground should have green fields to promote activities in nature to the children.
g) Universal design aspect in facilities must not be compromised.
h) Playground shall be equipped with rubbish bin / recycling bin, shaded trees, and energy efficient / renewable energy garden lights.

i) The quality and safety standards of the children playing facilities shall comply with any of the following requirements:
   i. MS 966: Part 1: Playground Equipment Specification for Materials.
   ii. MS 966: Part 2: Playground Equipment General Safety Requirements.

8.1.6 Recreational facilities shall be as follows unless otherwise stated in ***Appendix 1 – Project Brief*** and CBOR:

a) One (1) no. badminton court complete with lines, net-poles, net and galvanized mild steel umpire chair.
b) One (1) no. Football ground complete with lines, goal posts and net
c) Four (4) no. Volleyball court complete with lines, net-poles, net and galvanized mild steel umpire chair
d) Changing facilities with toilets, showers and changing cubicles complete with lockers for both males and females.

8.1.7 A children's playground area shall be provided within the living accommodation or staff family quarters in the site. All playground equipment's shall have a minimum number of composite structure and independent play events inclusive of as below, but not limited to the following:

a) Composite Play Structure:
   i. Two (2) nos. slides
   ii. Poles & Climber
   iii. Challenge ladder

b) Independent Play Events:
   i. Two (2) nos. see-saws
   ii. Four (4) nos. swings with two (2) nos. infant seats
   iii. Two (2) nos. spring events

SECTION 9.0: MAINTENANCE

9.1 GENERAL

9.1.1 This section shall be read in conjunction with Need Statement for Total Assets Management.

9.1.2 The successful tenderer shall submit a comprehensive maintenance program (duration of two (2) years period) to the PD.

9.1.3 The successful tenderer shall manage the operation and maintenance of the building project to ensure building optimal performance during defects liability period.

9.1.4 The successful tenderer is required to provide qualified and competent professionals to implement the maintenance program.

9.1.5 The successful tenderer shall incorporate design for maintainability in their design to avoid loss to the government and affect productivity due to the following:

a) High operation and maintenance cost
b) Longer waiting time for repair works
c) High downtime of systems / components
d) Risk of accident / injury during maintenance and repair works

9.1.6 The successful tenderer is required to provide the training on operation and maintenance to the government (client's representative) so that government can smoothly undertake the maintenance and operation of the said project.

9.1.7 All repair works performed and items replaced during the maintenance period shall be subjected to further similar guarantee from the date of repair / replacement.

9.1.8 The successful tenderer shall provide rooms for maintenance team and works (e.g. utilities Room, Janitor Room).

9.2 HANDOVER MANUAL & MAINTENANCE MANUAL

9.2.1 The successful tenderer shall prepare and submit four (4) sets of Handover Manual and Operation & Maintenance Manual to the satisfaction and approval of PD.

9.2.2 Contents of the handover manual:

a) The handover manual shall list down in detail the name of the manufacturer, type or model including reference code for easy maintenance including the warranty and guarantee where applicable. The following information shall be incorporated inside the handover manual:

i. Schedule of all Internal and External Wall & Floor Finishes.
ii. Schedule of Paint Work (Paint manufacturer, type and colour code).
iii. Schedule of Windows and Doors (Manufacturer / Supplier).
iv. Schedule of Ironmongery (Manufacturer and warranty).
v. Schedule of Sanitary Fittings (Manufacturer, model and code).
vi. Schedule of Built in Furniture (manufacturer and maintenance guide).
vii. Schedule and Inventory List of Loose Furniture and Equipment.
viii. Schedule of Fittings & Accessories.
ix. As-Built Drawings derived from as-built models for Architectural Building Works, M&E Works and C&S Works.
x. As-Built Model of building works in softcopy (.rvt & .nwd) of not less than LOD 500

b) This information shall be supplied for JKR's review in the following format:

i. Specially written information shall be on A4 size pages with typed text using double spacing and in a format agreed prior to submission.
ii. Drawn information shall generally be on A1 or A3 size sheets, carefully selected and edited to include only those items installed.
iii. All warranty and guarantee shall be for the said project and it shall be issued by the manufacturer or licensed distributor locally.

9.2.3 Contents of the maintenance manual:

a) The Maintenance Manual shall incorporate all maintenance systems and give details of the operation and required maintenance of all items, components and systems comprising the Works.
b) This information shall be supplied for JKR's review in the following format:

i. Specially written information shall be on A4 size pages with typed text using double spacing and in a format agreed prior to submission.
ii. Drawn information shall generally be on A1 size sheets.
iii. Standard published information shall be carefully selected and edited to include only those items installed.

9.2.4 The following component information shall be supplied for every item, component and/or system:

a) Certified manufacturing certificate
b) Full description giving any special features. A full breakdown of the parts and the catalogue number of the constituent parts.
c) The guarantee period of any element or material where in excess of the warranty required by the General Specification.

9.2.5 Maintenance Procedures: The Maintenance Manual shall include fully comprehensive details in respect of:

a) Cleaning procedures for all elements of the works
b) Replacement procedures
c) Regular cyclical maintenance procedures
d) Repair procedures in the event of damage
e) Washing methods, including the frequency and method of washing required to maintain performance and appearance. Details shall be provided in respect of the maximum time during which performance of components can be maintained, together with the frequency and method of washing required to achieve this.

9.3 DURABILITY

9.3.1 The performance criteria shall be satisfied for the full design life of the works provided if the maintenance has always been carried out as specified by the successful tenderer.

9.4 ASSET REGISTRATION, TAGGING AND INVENTORY

9.4.1 The successful tenderer shall implement the tagging and labelling for registration of all required asset components such as built-in and loose furniture, keys, locks etc. and shall follow JKR's requirement.

a) This shall require registration of assets, inventory documentation and collaboration with the client and the PD during the Defect Liability Period.
b) All labelling for registration of Immoveable Asset Components shall comply with JKR Standard Specification for Building Works 2014.

9.4.2 The successful tenderer shall identify and label *(Blok, Aras & Ruang)* asset information as per requirement of latest *Garis Panduan Pengumpulan data & Pelabelan Aset Tak Alih (PeDATA): Aset Bangunan and Sistem Kod Aset Tak Alih (SKATA)* in the design models and drawings.

9.4.3 The successful tenderer shall collect and fill up asset information as per requirement of *Garis Panduan Pengumpulan data & Pelabelan Aset Tak Alih (PeDATA): Aset Bangunan*. All related form / template shall also be submitted to PD / PD Representative.

9.4.4 The successful tenderer shall supply and install asset tagging (DPA, DAK – *Peringkat Blok, Aras & Ruang)* that comply with PeDATA specification and Sistem Kod Aset Tak Alih (SKATA).

9.4.5 The successful tenderer shall provide a complete set of hard copy together with digital copy to the PD / PD Representative for the purpose of registration and tagging works.

9.4.6 The successful tenderer shall compile the asset information as per requirement of latest *Garis Panduan Pengumpulan data & Pelabelan Aset Tak Alih (PeDATA): Aset Bangunan.*

9.4.7 The successful tenderer shall submit digital copy in the form of Microsoft Word / Excel Files (.doc/ .docm/. docx) / (.xls/.xlsm/.xlsx) of the followings to the PD / PD Representative:

a) Floor Layout Plan drawings derived from models (format or any other format as approved by PD / PD Representative) using 'SKATA room naming convention' in hard cover binding.

b) Asset information form / template (.xls/.xlsm/.xlsx format or any other format as approved by PD / PD Representative) and List of DAK Komponen (as per per Borang D.A 7 in *Garis Panduan Pengumpulan data & Pelabelan Aset Tak Alih (PeDATA): Aset Bangunan.*

9.5 AS-BUILT MODEL AND DRAWING

9.5.1 The as-built drawing derived from as-built models shall be provided as per contract requirement.

9.5.2 The successful tenderer shall generate As-Built Models (related to Scope of BIM Works) from the final updated Construction Models and shall represent the actual assembly of the project. The components are at LOD 500 (Refer **Appendix 16a and 16b**)

9.5.3 The successful tenderer shall update and link the As-Built Models with equipment and asset information. It shall be the successful tenderer responsibility to acquire and integrate the data into the said models. The As-Built Models shall be handed over to the P.D. once the project is completed.

9.5.4 The successful tenderer shall submit a digital copy of the model in the form of (.rvt and .nwd) to PD / PD Representative.

9.5.5 The successful tenderer shall provide a complete set of hard copy together with digital copy of as-built drawings generated from the as-built models to the PD/PD Representative for the purpose of as–built drawings registration process at Jabatan Kerja Raya Malaysia database.

9.5.6 The preparation and submission of drawings shall be as per requirement of latest *Garis Panduan Pengurusan Lukisan Siap Bina and Garis Panduan Pengumpulan data & Pelabelan Aset Tak Alih (PeDATA): Aset Bangunan.*

9.5.7 The successful tenderer shall submit a digital copy in the form of AutoCAD files (dwg and .dwfx) and PDF files (.pdf) to PD / PD Representative.

SECTION 10.0: CONTENTS OF TENDERER'S PROPOSAL

10.1 DESIGN PROPOSAL

10.1.1 The design proposal shall be professionally developed and refined to meet the proper functional requirements of each type of building and the correct functioning of each room. The proposal shall be in compliance to the requirements of the Local Authority and meet all regulatory requirements and approvals of any other government agencies.

10.1.2 The tenderers are required to submit a design proposal consisting of a design report, design models, drawings, specifications, schedules, calculations, catalogues etc. for the intended project in accordance with the works requirements.

10.1.3 Descriptions of planning principles and design descriptions shall be submitted complete with diagrams / charts of vehicular / pedestrian traffic flow, security and the various zones.

10.2 DESIGN REPORT

10.2.1 Design report shall consist of but not be limited to the followings:

a) Planning and design concept and principles of the proposal.
b) Design descriptions of the proposal.
c) Schematic drawings and sketches showing design intent.
d) Diagrams (Zoning, Circulation etc.)
e) Activity work flow
f) Proposed work programme.
g) IBS Score Calculation.
h) Preliminary Design Stage Assessment Report using pHJKR or other Green Rating Tools as required by the client.
i) Accessibility Check List compliance to MS 1184: 2014 Universal Design and Accessibility in Built Environment – Code of Practice and undertaking letter of compliance from the tenderer's consultant architect.

10.3 DESIGN MODEL

10.3.1 The Tenderers shall develop architectural, structural, mechanical, electrical and civil works models referred to **Scope of Works Related to BIM** in **Appendix 13** (also known as Design Model) for tender bidding purpose. The development of the models shall be in accordance to `List of Requirements of the BIM Deliverables' as per Appendix 15. The Level of Development of components shall **not less than LOD 200** (refer Appendix 16a and 16b).

10.3.2 All detailed design drawings submitted shall be generated from the model and printed complete with approved parameter names for tittle block.

10.3.3 The BIM Deliverables for use in tender proposal phase shall be referred to **Section 12: BIM Requirements** of this document

10.4 DRAWINGS

10.4.1. All drawings submitted shall be in metric scale, and drawings of buildings related to **Scope of BIM Works** (refer to **Appendix 13**), shall be generated from the design model. The drawings shall have title format approved by the PD and shall be orderly numbered.

10.4.2. Drawings submitted shall consist of but not be limited to the followings:

a) Key and Location Plan of the project site.
b) Master Plan of the entire site development, showing the layout of the buildings and infrastructure.
c) Detailed site layout of buildings, confined to area to be develop only, accurately surveyed and to be presented in minimum scale of 1:500.
d) Floor plans, elevations, sections and perspective views (interior and exterior) of all buildings.
e) All relevant Interior Design.
f) Landscape drawings.
g) All other pertinent support drawings for evaluation purposes.

10.4.3. The drawings shall indicate clearly building materials and finishes for floors, walls, ceilings, roofs and also structural methods to be used.

10.4.4. Floor plans shall also indicate position and extent (length and height) of built-in furniture and equipment proposed. Detailed design of built-in furniture shall be produced after award of tender.

10.4.5. Plans and drawings shall clearly indicate the name, use, room code, finishes and size of every room or area.

10.4.6. All areas and rooms shall be indicated type of ventilation in the floor plans.

10.5 LANDSCAPE DRAWINGS:

10.5.1 Landscape drawings shall consist of hard and soft landscaping works, complete with specifications of both landscaping materials. The tenderer is required to submit one (1) complete set of design proposal consisting of the brief write-up, design concept, drawings, specifications and schedules but not be limited to the following:

a) Landscape design concept and write-up
b) Landscape master plan
c) Layout plan
d) Elevations, section and perspective views
e) Complete planting schedule with actual plant photo
f) Planting detail
g) Working drawings and specifications and catalogue required shall be submitted to PD prior to construction.
h) Proposed maintenance schedule during Defect Liability Period.

10.6 INTERIOR DESIGN DRAWINGS:

10.6.1 For interior design works, the tenderers shall submit one (1) complete set of design proposal consisting of the brief write-up, design concept, drawings specifications and schedules as follows:

a) Coloured floor plans, reflected ceiling plans, elevations and sections.
b) Detailing (minimum not less than 1:20 scale)
c) Sample board of proposed finishes
d) Perspectives of all proposed areas
e) Specifications and Catalogues

10.7 SCHEDULES AND SPECIFICATIONS

10.6.1. The tenderers shall submit schedules in accordance to the requirements of the brief as the following:

a) Appendix 2 - Schedule of Accommodation (derived from design model)
b) Appendix 3 - Schedule of Internal and External Finishes (derived from design model)
c) Appendix 3a - Schedule of Painting Works
d) Appendix 4 - Schedule of Doors and Windows
e) Appendix 4a – Schedule of Architectural Components and Materials
f) Appendix 5 - Schedule of Ironmongery
g) Appendix 6 - Schedule of Sanitary Wares & Fittings
h) Appendix 7 - Schedule of Built-In Furniture
i) Appendix 8 - Schedule of Loose Furniture and Equipment
j) Appendix 9 - Schedule of Artworks and Carvings (where applicable)
k) Appendix 10 - Schedule of Fittings and Accessories (where applicable)
l) Appendix 11 - Schedule of Interior Signage (where applicable)
m) Appendix 12 - Schedule of Exterior Signage (where applicable)
n) Any other schedules as mentioned in the relevant sections of this pre-bid pertaining to Architectural, Interior Design and Landscape Works

10.6.2. The tenderer shall submit summary of architectural components and material catalogues, brochures and samples shall be provided to support the specifications for all building materials, furniture and equipment (where applicable). Minimum of three (3) equivalent alternatives shall be submitted for every specification proposed on materials, furniture and equipment.

10.7 ROOM DATA

10.7.1 The successful tenderer shall submit a room data document prior to compilation of the contract document. The room data shall consist of a breakdown of schedules and drawings generated from the design model.

10.7.2 The Room Data Sheet (The list, descriptions and specifications of the types of):

a) Floor, wall and ceiling finishes.
b) Loose and fixed furniture.

c) Doors and windows.
d) Ironmongeries.
e) Sanitary fittings and fixtures.
f) Mechanical and electrical services items such as lightings, switches, exhaust fans, fans, air-conditioning units, power sockets, telephone outlets, firefighting equipment and any other M & E equipment.
g) Any other items which may be proposed or provided for the individual rooms.

10.7.3 The drawings generated from design model shall consist of the followings:
a) Key floor plans.
b) The floor plans, elevations and ceiling plans of the individual rooms shall be fully loaded to show and indicate all the legends, types, descriptions, specifications, exact dimensions, locations, and numbers etc. of all the items as outlined in the schedules. All the drawings for the individual rooms shall tally with the schedules provided.

10.7.4 The Room Data document shall be submitted before the signing of contract document.

10.8 DOCUMENTATION FOR SUBMISSION

10.8.1 Submission for tenderer shall consist of the following:

a) Recommended paper sizes for documentation, presentation and submission shall be minimum as follows:

Item	Min. paper size / Scale
Presentation drawings and schedules for technical A3 proposal	A3
Proposal write-up, specifications, catalogues	A3
Main drawings generated from design model (readable and standard scale) in hardcopy - Architectural main drawings	1:100
Detail drawings (readable and standard scale) in hardcopy	A3
Exterior perspective drawings – 3 nos.	A2

Note: The tenderer shall also provide readable scaled drawings of the building as a whole.

b) BIM models shall be provided in accordance with the Government's Technical Requirements, 'Garis Panduan BIM JKR' and 'Piawaian BIM JKR', unless otherwise specified in the BPEP and subject to the P.D.'s acceptance, minimum as follows:

Item	Format
Outline of BIM Project Execution Plan (BPEP)	**.pdf / .doc**
Design Architectural BIM Model	**.rvt & .nwc**
Spatial Analysis Report based on Architectural Model	**.pdf**
Tender drawings documentation in softcopy	**.dwfx**
Sample of Architectural As-Built Model of any building works model (not less than LOD 500)	**.rvt**

10.8.2 All A1 and A0 size drawings shall be submitted in booklet type format (folded and binded maximum of A3 size).

10.9 DOCUMENTATION FOR SUBMISSION (SUCCESSFUL TENDERER)

10.9.1 Submission for successful tenderer shall consist of the following:

a) Recommended paper sizes for documentation, presentation and submission shall be minimum as follows:

Item	Min. paper size / Scale
Presentation drawings and schedules for A3 technical proposal	A3
Proposal write-up, specifications, catalogues	A3
Main drawings generated from design model (readable and standard scale) i. Architectural main drawings	1:100
Room Data Document i. Room data sheet ii. Drawing generated from design model - Room/Area Floor Plan	A3/1:50
Exterior perspective drawings generated from design model – 3 nos.	A2

Note: The tenderer shall also provide readable scaled drawings of the building as a whole and shall be prepared before Room Data Interaction commence.

b) BIM models shall be provided in accordance with the Government's Technical Requirements, 'Garis Panduan BIM JKR' and 'Piawaian BIM JKR', unless otherwise specified in the BPEP and subject to the P.D.'s acceptance, minimum as follows:

Item	Format
Outline of BIM Project Execution Plan (BPEP)	**.pdf / .doc**
Coordinated Design Architectural BIM Model	**.rvt & .nwc**
Spatial Analysis Report based on Architectural Model	**.pdf**
Tender drawings documentation in softcopy	**.dwfx**

c) Submission of building model in metric scale of suitable size shall be submitted upon PD's request or upon confirmation of any changes to architectural concept and it shall be the property of the government.

d) The successful tenderer shall submit Manual Quality for the quality assurance system of architectural works to the PD for his approval before commencement of works.

e) The development of the models shall be in accordance to `**List of Requirements of the BIM Deliverables**' as per **Appendix 15**

f) The successful tenderer shall ensure all contract drawings have complied to Non-Conformance Report (NCR) prior to Government's approval.

g) The successful tenderer is required to produce 3-D presentation drawings and animations of exterior and interior views of the proposal generated from design model (artist impression, perspective drawings, computer graphics, etc.).

h) The successful tenderer is required to document the whole process of construction in the form of photograph, video reports and construction simulation model.

i) Upon completion of the project, the successful tenderer is required to submit in four (4) sets of as-built drawings generated from design model in hard and soft copy as agreed by the PD.

j) A documented schedule of inventory for all loose and built-in furniture shall be submitted prior to handing over of project.

k) Upon the completion of the project the successful tenderer is required to submit four (4) complete sets of prints of the as-built drawings generated from design model, As-Built Models (not less than LOD 500) of the project in .rvt and .nwd format , As-Built drawings in soft copy in two (2) sets in form of CD-ROM – format .dwg, .dwfx, .rvt. and .nwd as required of latest released.

l) The successful tenderer is required to submit BIM Design Models in .rvt, four (4) sets of the working drawings and specifications to the PD prior to construction and within three (3) months after Letter of Award. BIM Design Models and two (2) copies of any subsequent amendment documents shall likewise be provided.

m) For monitoring purpose, the successful tenderer shall mandatorily submit the progressively updated models to the P.D., each at the stages of 10%, 25%, 50%, 75% and 100% project physical progress.

n) The successful tenderer shall prepare and submit a copy of EIA report for projects that require the preparation and submission of EIA for DOE approval (where applicable).

o) The successful tenderer shall prepare and submit an Environmental Management Plan (EMP) as required by the relevant authorities (where applicable).

p) The successful tenderer shall prepare and submit a Storm Water Management Proposal and Construction Waste Management Plan (MSMA) as required by the relevant authorities (where applicable).

q) The successful tenderer shall submit pHJKR or any other Green Rating Tools scorecard stating expected required marks together with Green Product Scoring System Score to the PD upon completion of the working drawings.

10.10 TENDERER'S PROPOSAL CHECKLIST

10.10.1 Submission checklist for the tenderer shall consist of the following:

Project Title:		
SUBMISSION CONTENT		**COMPLIANCE (√)**
DESIGN REPORT	CONSULTANT ARCHITECT -Registered with LAM -Registered with Ministry of Finance Malaysia	
	OTHER CONSULTANTS -Planner -Engineers -Quantity Surveyor	
	Outline of BIM PROJECT EXECUTION PLAN (BPEP)	
	PLANNING AND DESIGN CONCEPT	
	DESIGN DESCRIPTIONS OF THE PROPOSAL	
	SCHEMATIC DRAWINGS AND SKETCHES	
	DIAGRAMS (ZONING, CIRCULATION etc.)	
	SPATIAL ANALYSIS REPORT based on Architectural BIM Model	
	ACTIVITY WORK FLOW	
	PROPOSED WORK PROGRAMME	
	IBS SCORE CALCULATION	
	SUSTAINABLE DESIGN PROPOSAL	
ARCHITECTURE DRAWINGS	KEY PLAN AND LOCATION PLAN	
	MASTER PLAN	
	FLOOR PLAN	
	ELEVATION	
	SECTION	
	PERSPECTIVES	
	LANDSCAPE	
	INTERIOR DESIGN WORKS	

DESIGN MODEL	ARCHITECTURAL DESIGN BIM MODELS (.rvt & .nwc)	
	SAMPLE OF AS-BUILT MODEL (.rvt)	
SCHEDULES	SCHEDULE OF ACCOMMODATION (Generated from design model)	
	SCHEDULE OF INTERNAL AND EXTERNAL FINISHES	
	SCHEDULE OF PAINTING WORKS	
	SCHEDULE OF DOORS AND WINDOWS	
	SCHEDULE OF ARCHITECTURAL COMPONENTS AND MATERIALS	
	SCHEDULE OF IRONMONGERY	
	SANITARY WARES & FITTINGS	
	BUILT-IN FURNITURE	
	LOOSE FURNITURE AND EQUIPMENT	
	ARTWORKS AND CARVINGS (WHERE APPLICABLE)	
	FITTINGS AND ACCESSORIES (WHERE APPLICABLE)	
	INTERIOR SIGNAGE (WHERE APPLICABLE)	
	EXTERIOR SIGNAGE (WHERE APPLICABLE)	
SPECIFICATION (CATALOGUE/ SAMPLE)	FLOOR FINISHES	
	WALL FINISHES	
	CEILING FINISHES	
	ROOF FINISHES	
	DOOR	
	WINDOW	
	IRONMONGERY	
	SANITARY FITTINGS	
	PAINTING	

SECTION 11.0: REQUIREMENT OF APPROVING AUTHORITIES

11.1 GENERAL

11.1.1 The successful tenderer shall appoint an Architect registered with the Board of Architects, Malaysia, who is competent and experienced to execute all basic services and where applicable for supplementary services for the whole project. The professional fees for the scope of services provided by the Architect shall be borne by the tenderer in accordance to the Architects Act 1967, Architect Rules (Scale of Minimum Fees) 2010.

11.1.2 The successful tenderer shall appoint a landscape architect and/or Town Planner who is competent and experienced to execute works as required by the Local Authority for the said project. The professional fees for the scope of services provided by the landscape architect and/or Town Planner shall be borne by the tenderer.

11.1.3 Where required by the Government, the successful tenderer shall appoint other consultants who are competent and experienced to execute works related to the said project. The fees for the scope of services provided by these consultants shall be borne by the successful tenderer to the government's approval.

11.1.4 The successful tenderer shall obtain the approval requirements from the Local Authority and other technical agencies, and comply with Malaysian statutory regulations and by-laws as highlighted below:

a) **Planning Permission**
The development proposed shall obtain planning permission and abide by all conditions imposed by the Local Planning Authority. Town and Country Planning Act 1976 (Act 172) (TCPA) section 19 and 20 requires planning permission to be obtained prior to any development. Requirements for the planning permission shall include documents, layout plans, development proposal report, EIA approval if required and prescribed fees.

b) **Building Approval**
All building approval applications are required to be submitted to the respective local authorities as provided for under section 70 of Street, Drainage and Building Act 1974 (Act 133) (SDBA). Term and technical requirements for submitting plans shall be in accordance of the Uniform

Building By-Law 1984 (UBBL). Submission for building plan approval shall be made by the Principal Submitting Person (PSP) and shall include submission of all drawings, calculations and documents in orderly manner.

c) **Certificate of Completion and Compliance (CCC)**
Upon satisfactory completion of works and obtaining clearances or confirmation from the local authority and the respective technical departments, the PSP shall issue CCC for the said project.

d) **Fire Certification Designated**
All designated premises must have a fire certification issued by JBPM as per Fire Services Act 1988. The PSP shall compile the necessary documents such as copy of CCC, approved building plans and land ownership for the client to submit for the fire certification.

11.1.5 The successful tenderer shall be responsible to liaise with the relevant Local Authority including other technical agencies regarding the infrastructure facilities required such as water supply, electrical power, telecommunication, firefighting requirements, drainage, sewerage, access roads, the rubbish disposal etc., and thus to provide all the necessary requirements in relation to them for this project.

11.1.6 Whenever required by the by-law or regulations, the successful tenderer shall be responsible to prepare and submit drawings, calculations and/or documents to the relevant Authorities for approval through the local practicing professionals who have registered with the relevant boards.

11.1.7 Prior to submission to the approving authorities, the PD shall agree with all designs, drawings and specifications. A copy of all correspondences and replies to/from the approving authorities shall be extended to the PD.

11.1.8 The successful tenderer shall be responsible to inform the related technical departments regarding the development of the project, such as the Town Planning Department, the Local Authorities Council etc.

SECTION 12.0: BUILDING INFORMATION MODELLING (BIM)

12.1 GENERAL PRINCIPLES

12.1.1. The purpose of this section is to define the minimum requirements for the use of BIM in the project and shall include the generation of information rich-model, model revision, visualization and analysis, and collaborative use of BIM throughout the project duration as defined in the document.

12.1.2. This section does not effectuate or require a restructuring of a contractual relationships or shifting of risks of the tenderer. Nothing in these section shall relieve the successful tenderer from its obligation, nor diminish the role of the successful tenderer as the person responsible for and in charge of the design, construction, completion, supervision and maintenance of the project.

12.1.3. Unless otherwise agreed in the BIM Project Execution Plan (BPEP), the dimensional tolerances provided in the Government's Technical Requirements shall apply to dimensions in a model.

12.1.4. The BIM models are not intended to provide the Level of Development (LOD) needed to extract precise object and material quantities, unless this is required and agreed in the BPEP.

12.1.5. None of the documents in this requirement shall be used by the successful tenderer for any purpose other than this Contract.

12.1.6. The successful tenderer shall provide everything necessary for the proper execution of BIM until its completion according to the true intent and meaning of the Contract taken together whether the same may or may not be particularly shown or described provided the same can be reasonably inferred therefrom.

12.1.7. The Appendices to this Contract; including but not limited to Government's Requirements, tenderer's Proposal, BIM models and any drawings, documents produced from the models; are to be taken as mutually explanatory of one another, but in the event of any discrepancy and ambiguity the same shall be explained by the P.D. to the successful tenderer who shall rectify the discrepancy at his own cost and expense.

12.1.8. If there remain ambiguities or discrepancies between the Government's Requirements and the tenderer Proposal, the Government's Requirements shall prevail without adjustment of the Contract Sum. Provided that if in the opinion of the P.D, the successful tenderer's Proposal is better than the Government's Requirements in term of BIM modelling requirements, the successful tenderer's Proposal shall prevail.

12.1.9. Any ambiguity or discrepancy within the Government's Requirements shall be explained and resolved by the P.D. who shall thereupon issue appropriate instructions to the successful tenderer.

12.1.10. Where there is a discrepancy within the successful tenderer's Proposals or drawings produced from the model, the successful tenderer shall inform the P.D. in writing of his proposed amendment to remove the discrepancy and (subject always to compliance with Statutory Requirements), the P.D. shall decide on the discrepant items or otherwise may accept the successful tenderer proposed amendment and shall be obliged to comply with the decision or acceptance by the P.D. without cost to the Government.

12.1.11. The Government gives no warranty in any manner or whatsoever for any information provided by the Government in the Contract as to their accuracy or sufficiency or as to how the same shall be interpreted and the Government shall not be liable if such information is inaccurate or insufficient. The successful tenderer shall not be relieved from his obligations to ensure that such information is accurate and sufficient for the purpose of this Contract.

12.2 SCOPE OF WORKS RELATED TO BIM

12.2.1 The Description of the Scope of Works Related to BIM in the project are as per **Appendix 13 – BIM BRIEF** attached.

12.3 BIM OBJECTIVES

12.3.1 The principal objective of incorporating BIM is to improve the quality of project delivery and the exchange of information between the relevant stake holders. BIM project requirements shall include modelling, visualization, analysis and documentation of the building design and shall assist in validating the scope and cost of the project. This requires cooperation among the Tenderer's project team, JKR's project team and client. The use of BIM in this project shall involve the processes of creating information-rich BIM models, analysis and production of design documents from the models. The generated models and analysis results shall be used to support the decision making process required for the project. Eventually the model will be used as a record model for asset information requirements.

12.3.2 The BIM processes shall be used for the design which include but not limited to architectural, structural, civil, mechanical and electrical works, and specialty equipment. During the design development phase, BIM shall be used to develop and establish the basis of design in accordance with this section and Government's Technical Requirements. The BIM objectives for this Project are as per described in **Appendix 13**.

12.4 BIM DELIVERABLES

12.4.1 The successful tenderer shall coordinate and prepare the BIM Deliverables as indicated in the **Appendix 14**. The typical BIM elements to be provided in the BIM models shall be in accordance with the Government's Technical Requirements, 'Garis Panduan BIM JKR' and 'Piawaian BIM JKR', unless otherwise specified in the BPEP and subject to the P.D.'s acceptance.

12.4.2 The model shall include all geometry, physical characteristics, materials, coding, tagging, graphic, specifications and product data needed to describe the design and construction works, and the as-built for the works done. All drawings, schedules, simulations and services required for assessment, review, analysis and construction shall be extracted from this model.

12.4.3 BIM Deliverables shall be produced, updated, submitted and shared in accordance to the requirements as specified.

12.4.4 The successful tenderer shall be liable for any electronic file corruption or unintended amendment, modification or alteration of data available in the BIM deliverables during the transmission and/or submission process. The successful tenderer shall ensure that the BIM deliverables are protected from any threat during transmission via folders/devices/web/internet by providing comprehensive maintenance, routine scanning and back-up programs throughout the contract period until the issuance of Certificate of Practical Completion, all at the expenses of the successful tenderer. The maintenance shall include all necessary periodic servicing and renewal of licenses, fees and charges for the usage of the BIM deliverables.

12.4.5 All drawings shall be generated from the design models, complete with time stamp.

12.5 MODEL QUALITY

The model quality shall include but not limited to:

12.5.1 Components with accurate geometry, function, type, coding, specification, material, graphic and associated parameters according to LOD requirements;

12.5.2 Materials with coding, specification, graphic and rendered properties according to LOD requirements;

12.5.3 An efficient, consistent and accurate modelling practice with acceptable related warnings: e.g. eliminate object overlap, incorrect close wall intersections, etc;

12.5.4 Parametric models and components with dimension accuracy according to design intent, analysis and construction;

12.5.5 Models with correct application of material and functionality;

12.5.6 The use of correct component classification for modelling: e.g. the use of furniture category object for a table;

12.5.7 The maintenance of parametric linkages within the model at all times to enable automatic generation of all plans, sections, elevations, custom details and schedules as well as 3D views. Documentation of the models shall not happen outside of the BIM software;

12.5.8 The use of appropriate and interoperable viewing, checking, and output file formats such as dwfx, nwd, etc.,

12.5.9 The use of model checking tools (e.g. Navisworks Manage) to confirm the validity and accuracy of files/models and adherence to design requirement/needs statement; and

12.5.10 If the exact equipment specification is not available for tender submission purposes, the equipment shall be modelled to form its overall height, length, width and depth, in accordance to design specified in the Government's Technical Requirements.

12.6 MODEL DEVELOPMENT PHASE AND BIM DELIVERABLES

12.6.1 The tenderer shall provide BIM models created with LOD required for each project phases specified in '**Appendix 16a & 16b**'. The models shall be embodied with proper object information and parametric relationship in accordance with good engineering practice.

12.6.2 The model development shall be classified in accordance with the project development stages. The list of parameter names required to determine the LOD are as per Appendix 16a & 16b.

12.6.3 The model submitted shall be in manageable order by using project browser, naming convention and project template according to 'Garis Panduan BIM JKR' and 'Piawaian BIM JKR'. All the above requirements must be managed accordingly by using Project Browser in Revit.

12.6.4 Unless otherwise stated in this section, any existing building or structure that interfaces with the project shall be modelled as massing model(s) to address the potential interferences at the areas of interface during the project.

12.6.5 All components in the model shall be tagged and labelled according to the design component including but not limited to zoning and looping.

12.6.6 All floor areas, schedules of material and schedules of quantity shall be extracted directly from the model to support cost estimation. These schedules generated will be used solely as a guide for cost estimation. Any quantity or figure produced in the tenderer 's Proposal for any system or portion of work shall be taken as purely indicative only. No claims shall be entertained on any discrepancy in quantities and/or work items.

12.6.7 Unless otherwise specified, the tenderer shall refer to **Appendix 16a, and 16b** which indicate the parameter names required for LOD 100 to LOD 500 for all the model elements and components used (as per provided in the JKR Project and Family Template). Component schedules shall be generated from the model to indicate all the symbols, description and quantities for every element. However, any additional parameter name and/or component family required by the Government in order to suit the accepted design, shall be developed and added by the successful tenderer and shall not be treated as variation to the contract.

12.6.8 The development of the BIM models required for this project must be confirmed with the **List of Requirements of The BIM Deliverables (Appendix 15)**. The tenderer shall submit all the BIM models including all the necessary checklist forms as required together with their proposal.

12.7 MODEL DEVELOPMENT AND BIM DELIVERABLES SPECIFIED IN PHASES

12.7.1 TENDER PROPOSAL PHASE

The tenderer shall involve the followings for Tender Proposal Phase, as per required in the Tenderer's Proposal Checklist in **Section 10.10**:

I. Design Model

a) The tenderer shall develop architectural works models (also known as Design Model) for tender bidding purpose. The Level of Development of components shall **not less than LOD 200** (refer Appendix 16a and 16b).

b) The BIM Deliverables for use in tender proposal phase are as follows:

i. Model Requirements

- The tenderer shall include but not limited to model the following architectural elements as per described in this document to a level that defines the design intent and accurately represents the detailed design solution. The family component should be organised according to category, function, material, size, finishes, external and internal function and other properties where applicable. Architectural elements are to be modelled for within architectural discipline and interdisciplinary coordination (details as per Appendix 16a and 16b):

  - Site plan
  - Roof
  - Floor
  - Walls
  - Ceiling
  - Window
  - Door
  - Sanitary Fittings
  - Staircase, Railings
  - Interior Works
  - Fixtures & Equipment

- All drawing shall be generated from the design model.
- Vertical continuous elements such as walls, columns and staircase shall be modelled separately according to levels.

ii. Spatial Requirements Analysis

The tenderer is required to validate space planning in accordance to Schedule of Accommodations (SOA) as required in Section 3.0 using Massing, Area Plan and Room object. The validation of spaces shall comprise but not limited to the followings:

- Zoning by classified group functions;
- Area by departments, levels and blocks;
- Norm floor area;
- Total nett area;
- Total circulation;
- Total services area;
- Total gross floor area;
- Capacity;
- Adequacy of proposed area;
- Room finishes;
- Ceiling height;
- Air conditioning and ventilation provision; and
- Percentage ratio of functional and non-functional area (e.g. clinical area and non-clinical area).

II. DESIGN PROPOSAL DRAWINGS

a) The tenderer shall submit the drawings to be graphically and alphanumerically included in and derived from the model only, complete with time stamp.

III. SAMPLE OF AS-BUILT MODEL

a) The tenderer is required to submit one (1) sample of proposed As-Built Model (not less than LOD 500), which shall include Architectural, Civil Works, Structural, Mechanical and Electrical Model to match requirements as specified in the Appendix 16a and 16b in all respects for tender bidding purpose.

b) The sample of As-Built Model(s) which had been approved and accepted during the tender evaluation will be issued as the standard of comparison for the As-Built Model to be created and handed over to the Government.

12.7.2 DETAILED DESIGN PHASE

The successful tenderer shall involve the followings for Detail Design Phase, as required in the **Appendix 14 – BIM Deliverables Summary:**

I. Model

a) The successful tenderer shall develop architectural models to the Level of Development of components shall **not less than LOD 300**. The development of the models shall be in accordance to 'List Of Requirements Of The BIM Deliverables' (Appendix 15).

b) All detailed design drawings submitted shall be generated from the model and printed complete with approved parameter names for tittle block.

c) The successful tenderer shall include but not limited to model the following architectural elements as per described in this document to a level that defines the design intent and accurately represents the detailed design solution.

<table>
<tr><td colspan="2">Area Plan
(zoning of building programme)</td></tr>
<tr><td>Site plan
inclusive the followings to be modeled using toposurface tools
a) Road;
b) Ancillary buildings in massing model (LOD 200);
c) Parking lot;
d) Entrance;
e) Perimeter fencing;
f) BOMBA and local authority requirement fixtures;
g) Sport utilities area;
h) Furnished model with 2D lines for drainage lines, culvert, road arrows, road dimensions, road bend radius, setting out, engineering wall, manhole, egress and ingress; and
i) Site plan to be modeled using separate file from building model.</td><td>Roof
a) Appropriate structural members needed to complete the architectural model;
b) Roof covering and cladding;
c) Insulation, fascia board, gutter and rainwater down pipe;
d) Roof, slab and ceiling slopes, if needed;
e) Soffits and openings;
f) Insulations, ceiling systems and slabs; and
g) Roof accessories.</td></tr>
<tr><td>FLOOR
h) Appropriate structural members needed to complete the architectural model;
i) Finishes in layers;
j) Water proofing system;
k) Insulation;
l) Floor accessories;
m) Floor slope symbol;
n) Internal or external indication; and
o) Type according to room function.</td><td>ALL WALLS, CURTAIN WALLS AND PARTITIONS (but not limited to):
p) All openings;
q) Overhangs, sun control elements;
r) Parapets, screening elements;
s) Architectural precast.
t) Finishes in layers;
u) Water proofing system;
v) Insulation;
w) Wall accessories;
x) Internal or external indication; and</td></tr>
</table>

	y) Type according to room function.
CEILING z) Ceiling system; aa) Finishes in layers; bb) Insulation; cc) Ceiling openings; dd) Ceiling accessories; and ee) Type according to room function.	**WINDOWS AND DOORS** ff) Frames, window and door leaves; gg) Sill heights for windows; hh) Internal or external indication; and ii) Type according to room function.
SANITARY FITTINGS AND FIXTURES jj) Connectors and brackets; kk) Counter tops and finishes; and ll) Type according to room function.	**STAIRCASE AND RAILINGS** mm) Function and Location; and nn) Finishes in layers.
OTHERS • Ramps • Shafts, risers, trenches • Built-ins, shelving, and other interior architectural elements • Symbols for passive and active fire protections (BOMBA requirements) • Hardscape	**INTERIOR WORKS, FURNISHINGS AND OTHER FITTINGS** oo) Interior works and design; pp) Furniture works; - Furniture (Fixed and Loose); and - Furniture Systems. qq) Soft furnishings; and rr) Signage and Directories - Model in 2D in plan with associate parameters.
FIXTURES AND EQUIPMENT: ss) Specialty equipment (e.g. medical equipment); and Mechanical, electrical and plumbing items that require architectural space (e.g. water tanks, switchboards, lifts, etc.), finishes selection and fixtures (e.g. lighting fixtures) for 3D visualization.	

The tenderer ~~Contractor~~ is required to generate all related schedules from the models as described in this document including but not limited to sheet list, view

list, schedule of space / area conformance, component and material codes, legends, tagging and key room finishes.

II. Clash Analysis

a) Clash Analysis shall be carried out prior to the commencement of construction phase to identify interferences of building components within each discipline and among disciplines. Clashes need to be resolved upfront to reduce conflicts that may have cost implication and cause delay in project completion.

b) Throughout the modelling process, any design conflict or clash or interference shall be identified and properly documented. There shall be no clash between the components to ensure that the design intent is met.

c) Clashes in the model are categorized into two (2) types:

   i. Hard Clash - Two (2) components or elements occupy the same space; and

   ii. Soft Clash - Components or elements having insufficient spatial/ geometric tolerance or buffer.

d) The successful tenderer shall fulfil the followings:

   i. Carry out Clash Analysis on Architectural, Structural, Mechanical, Electrical and Civil Works model

   ii. The Clash Analysis Reports shall be submitted for reference as and when requested by the P.D.; and

   iii. Every clash identified in Clash Analysis Reports must be resolved before construction works begin on site. No claims for extra cost shall be entertained for any essential part of the clash resolution in order to suit the accepted design.

III. Design Coordination

a) The successful tenderer shall carry out design coordination to check on the integrity of all the detailed Design Model.

b) The aim of the design coordination is to resolve discrepancies in drawing details and design documentation, lack of design information and constructability issues before the commencement of works on site. The successful tenderer shall fulfil the followings:

i. Carry out visual demonstration on the coordinated detailed Design Models such as walkthroughs, sectioning, measures and mark-ups upon stake holders request in Technical and Site Meeting throughout the whole project duration; and

ii. The Design Coordination Reports shall be submitted for reference as and when requested by the P.D.

IV. Coordinated Model

a) Coordinated Model is the BIM deliverable at detailed design phase.

b) The successful tenderer shall submit Coordinated Model consists of the combination of the completed final design and clash-free Architectural, Structural, Mechanical and Electrical models before the commencement of the works on site. This Coordinated Model shall be ready to be used as a Construction Model.

12.7.3 CONSTRUCTION PHASE

The successful tenderer shall continue to develop, maintain and update the Architectural, Structural, Civil Works, Mechanical and Electrical Models (also known as Construction Models) progressively during construction period. All information needed for Construction Documents shall be graphically or alphanumerically included in and derived from these models only. The components Level of Development shall be **not less than**

LOD 400 in which the models will include details such as final size, shape, material and orientation used for construction and fabrication purposes (Refer Appendix 16a & 16b).

The BIM Deliverables for use in the construction phase are as follows (refer to Appendix 15):

I. Construction Models

a) Construction Models are BIM deliverables at construction phase.

b) The successful tenderer shall develop Construction Models complete with approved fabrication and assembly details where applicable or useful for construction works. The models shall reflect the latest technical requirements approved by the P.D. The Construction Models shall be used for construction simulation, site coordination and construction administration documents e.g. RFIs, Directives and Variation Orders (VO).

c) The successful tenderer shall update these models progressively to include any change that may occur during construction.

d) For monitoring purpose, the successful tenderer shall mandatorily submit the progressively updated models to the P.D., each at the stages of 10%, 25%, 50%, 75% and 100% project physical progress as per required in the BPEP.

e) Nevertheless, the successful tenderer shall also able to provide the updated models at any construction progress stage whenever required by the P.D. The final submission of the models shall lead to the production of the project As-Built Models.

f) The successful tenderer must ensure that each model's developed always adhere to the Sistem Kod Aset Tak Alih (SKATA) and Garis Panduan Pengumpulan & Pelabelan Aset Tak Alih Kerajaan (PeDATA). This includes naming convention for building's code, building's level code, space area code and component's object code

II. Clash Analysis

In the event where design/work changes occurred during construction phase upon P.D.'s instructions and require coordination to be done, the successful tenderer shall carry out Clash Analysis for that particular part(s) involved, all in accordance to Section 12.7.2 (ii).

III. Design Coordination

In the event where design/work changes occurred during construction phase upon P.D.'s instructions and require coordination to be done, the successful tenderer shall carry out Design Coordination for that particular part(s) involved, all in accordance to Section 12.7.2 (iii).

IV. Construction Drawings

a) The successful tenderer shall submit the drawings as specified in the Government's Technical Requirements. Submitted drawings including specifications, building component and material coding shall be generated from the models. All information needed for Construction Drawings shall be graphically and alphanumerically included in and derived from the model only.

b) Soft copies of Construction Drawings shall be produced in .dwfx and .dwg format complete with time stamp. The printed version of the Construction Drawings as required by the contract shall be produced from these soft copies.

V. Construction Simulation Model

a) Construction Simulation Model is a BIM deliverable at construction phase.

12.7.4 **CLOSE-OUT PHASE**

The BIM Deliverables at the close-out phase are as follows:

I. As-Built Models

a) The successful tenderer shall generate As-Built Models from the final updated Construction Models and shall represent the actual assembly of the project. The components are at **LOD 500**(Refer Appendix 16a and 16b).

b) The successful tenderer shall update and link the As-Built Models with equipment and asset information. It shall be the Contractor's responsibility to acquire and integrate the data into the said models. The As-Built Models shall be handed over to the P.D. once the project is completed.

II. As-Built Drawings

a) The successful tenderer shall produce the As-Built Drawings generated from the As-Built Models as specified in the Contract.

b) Soft copies of As-Built Drawings shall be submitted in .pdf, .dwfx and .dwg formats complete with time stamp.

c) The printed version of the As-Built Drawings as required by the contract shall be produced from these soft copies.

LIST OF APPENDIX

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APPENDICES

APPENDIX 1

PROJECT BRIEF

	Subject	**Description**
A	PROJECT TITLE	
B	LOCATION OF SITE	
	KEY PLAN	
	LOCATION PLAN	
	SITE PLAN	- (lot, road, district, state), with an approximate site area in (acres / hectares / metre square)
C	THE DESCRIPTION OF SITE CONDITIONS	
D	PROJECT COMPONENTS	Example: i) Bangunan Pentadbiran ii) Dewan Serbaguna iii) Gelanggang Tennis iv) Auditorium

Note : Schedule given for a reference only.

APPENDIX 2

SCHEDULE OF ACCOMODATION

Project Name:
Location:

Space / Function / Room/ Area / Designation by Level	**Capacity**	**Norms Floor Area Based on EPU (m^2)**	**Total Area (m^2)**	**Ventilation**
Nett Floor Area (NFA) by Level				
Total NFA				
Total Circulation				
Total Services				
Total Gross Floor Area (GFA)				

Note: Schedule given for a reference only.

Legend:

Al. Aluminium
AB Acoustic Board
AC Asbestos Cement
Bk Common Bricks
BRF Built-up Roofing Felt
CBk Cement Sand Brick
CR Cement Rendering
CT Ceramic Tiles
Con. Concrete
Con.T Concrete Tiles
CCR Colour Cement Rendering
CHB Concrete Hollow Bricks
Ff. Fairface
FSM Fairface Screen Mall

FCB Fibre Cement Board
GMD Galvanised Metal Decking
GWB Glass Wool Board
HP Hybrid Plaster
Ms Marble Slab
MFB Mineral Fibre Board
MSW Metal Framed Screen Wall
OGB Ordinary Gypsum Board
Pqt. Parquet
PF Plastered Finish
PCM Precast Concrete Members
QT Quarry Tiles
RC Reinforced Concrete
RGB Reinforced Gypsum Board
St. Steel
T Timber
Tyn. Tyrolean
TB Timber Boarding
Ts Timber Strip
TT Terrazzo Tiles
TSW Timber Framed Screen Wall
VT Vinyl Tiles
WCB Waterproof Cement Board
WCR Waterproof Cement Rendering

APPENDIX 2a

CONCEPTUAL DESIGN DRAWINGS

APPENDIX 3

SCHEDULE OF INTERNAL AND EXTERNAL FINISHES

APPENDIX 3

SCHEDULE OF INTERNAL AND EXTERNAL FINISHES

Project:

Room	FINISHES				VENTILATION	NOISE LEVEL (dB)	REMARKS
	FLOOR	SKIRTING	WALL	CEILING			

Note: Schedule given for a reference only.

Legend:

vr1	-	Heavy duty vinyl flooring (roll form)
vr2	-	Heavy duty chemical resistance Vinyl Flooring (roll form)
vr3	-	Heavy duty anti-static Vinyl Flooring (roll form)
cp1	-	Heavy duty carpet flooring (loop pile 36 oz.)
cp2	-	Heavy duty carpet tiles (300 x 300mm 26 oz.)
cp3	-	Heavy duty carpet flooring (loop pile 26 oz.)
cp4	-	Heavy duty carpet tiles (300 x 300mm 26 oz.)
cp5	-	Heavy duty carpet tiles (300 x 300mm 36 oz.) with raised floor system
tp1	-	Medium duty timber strip (Glue System)
tp2	-	Heavy duty timber strip (e.g. HDF Board or equivalent)
fh1	-	Cement sand screed with floor hardener
ep1	-	Cement sand screed with Epoxy Coating & Floor Hardener
lk1	-	Waterproofed cement sand screed/power float
gn1	-	Selected granite floor tile (300 x 300mm)
gn2	-	Selected granite floor tile (600 x 600mm)
pgn1	-	Selected porcelain granite floor tiles (300 x 300mm) (polished)
pgn2	-	Selected porcelain granite floor tiles (600 x 600mm) (polished)
ct1	-	Ceramic Tiles (200 x 200mm)(Glossy Finish)
ct2	-	Ceramic Tiles(300 x 300mm) (Glossy Finish)
ct3	-	Ceramic Tiles (200 x 200mm)(Glazed Finished)
ct4	-	Ceramic Tiles (300 x 300mm) (Glazed Finished)
ct5	-	Ceramic Tiles (200 x 200mm) (Matt Finished)
ct6	-	Ceramic Tiles (300 x 300mm) (Matt Finished)
ht1	-	Homogeneous Tiles (200 x 200mm) (Glossy Finished)
ht2	-	Homogeneous Tiles (300 x 300mm) (Glossy Finished)
ht3	-	Homogeneous Tiles (200 x 200mm) (Glazed Finished)
ht4	-	Homogeneous Tiles (300 x 300mm) (Glazed Finished)
ht5	-	Homogeneous Tiles (200 x 200mm) (Matt Finished)
ht6	-	Homogeneous Tiles (300 x 300mm)(Matt Finished)
csp1	-	Cement sand screed with waterproofing
ppp1	-	Plaster with class ‘O’ P.U Paint
cm1	-	Chequered Aluminium Metal Plate
sd1	-	Specialist Detail
cr1	-	Cement sand screed, smooth finish
sv1	-	100mm high heavy duty skirting to match
sht1	-	100(h) x 200 x 200mm homogeneous tiles to match
sht2	-	100(h) x 300 x 300mm homogeneous tiles to match
sgn1	-	200(h) x 300 x 300mm granite to match
stp1	-	75mm(h) timber skirting to match
tsi1	-	100mm higher timber skirting

pp1	-	Plaster & Paint
sp1	-	Plaster & Coating
ac1	-	Acoustic Fabric Panel
ac2	-	Acoustic Metal Panel
ct7	-	Ceramic Tiles (200 x 200mm) (Glossy Finished) (5 Ft.)
ct8	-	Ceramic Tiles (300 x 300mm) (Glossy Finished) (5 Ft.)
ct9	-	Ceramic Tiles (200 x 200mm) (Glossy Finished) (Ceiling Height)
tp1	-	Timber Strip Ceiling
ai1	-	Aluminium Strip Panel
ls1	-	Fibre Glass Cement Render
pc2	-	Fibrous Plaster Ceiling (metal section) with UPVC rain gutter
pc3	-	Gypsum Board Ceiling Suspended (600x1200mm)
as1	-	Insulated Aluminium Strip Ceiling
si1	-	Aluminium Panel Suspended (600x600mm)
sal1	-	100mm (h) Aluminium skirting to match
uc1	-	UAC Superflex Ceiling Fixed to Timber Support Complete with Acoustic Insulation (600x1200mm)
uc2	-	UAC Superflex Ceiling Fixed to Timber Support (600x1200mm)
uc3	-	UAC Superflex Ceiling Fixed to Timber Support with Thermal Insulation (600x1200mm)

Notes : All plastered wall and ceilings inside all labs shall be painted with anti-fungus paint or approval equivalent. All other plastered wall and ceilings shall be painted with P.U paint or approved equivalent.

APPENDIX 3a

SCHEDULE OF PAINT WORKS

Notes:

Paints to be used shall be the type supplied by the manufacturer stated on the current JKR approved lists and comply with the Architectural Works Brief. The tenderer is required to fill in the information below stating the types of paint for various types of surface to be applied in the buildings. All relevant technical brochures, leaflets and etc. must be submitted together with the tender.

No.	**Name of building**	**Brand:**			
		Plastered surfaces/ Drywall		**Timber and steel surfaces**	
		Internal	**External**	**Internal**	**External**

Note : Schedule given for a reference only.

APPENDIX 4

SCHEDULE OF WINDOWS AND DOORS

No.	Rooms	Window		Door	
		Type	**Type of frame/panel**	**Type**	**Type of frame/panel**

Note : Schedule given for a reference only.

APPENDIX 4a

SCHEDULE OF ARCHITECTURAL COMPONENTS AND MATERIALS

The tenderer is required to fill in the information below, stating the brand name and model number against item required for this project. Any other item not mentioned here but required shall be inserted at the space provided. All relevant technical brochures, leaflets etc., must be submitted together with the proposal. The tenderer is required to prepare separate schedules of architectural components and materials for all block of buildings.

Architectural component	**Description**	**Brand / Range / Series**			**remarks**
		Brand 1	**Brand 2**	**Brand 3**	

Note : Schedule given for a reference only.

APPENDIX 5

SCHEDULE OF IRONMONGERY

The tenderer is required to fill in the information below, stating the brand name and model number against item required for this project. Any other item not mentioned here but required shall be inserted at the space provided. All relevant technical brochures, leaflets etc., must be submitted together with the proposal. The tenderer is required to prepare separate schedules of ironmongery for all block of buildings.

Type	Description	Brand name	Model number

Note : Schedule given for a reference only.

APPENDIX 6

SCHEDULE OF SANITARY WARES AND FITTINGS

The tenderer is required to fill in the information below, stating the brand name and model number against item required for this project. Any other item not mentioned here but required shall be inserted at the space provided. All relevant technical brochures, leaflets etc., must be submitted together with the proposal. The tenderer is required to prepare separate Schedules of Sanitary Wares and Fittings for all block of buildings.

Type	**Description**	**Brand name**	**Model number**
Squatting wc with flush valve			
Pedestal wc with flush valve			
Wash hand basin to toilet			
Vanity top with integral bowl to toilet			
Soap dispenser			
Soap holder			

Note : Schedule given for a reference only.

APPENDIX 7

SCHEDULE OF BUILT-IN FURNITURE

Project:

No.	Items	Unit

APPENDIX 8

SCHEDULE OF LOOSE FURNITURE AND OTHER FITTINGS

Project:

No.	Items	Unit

APPENDIX 9

SCHEDULE OF ARTWORKS AND CARVINGS

Project:

No.	Items	Unit

APPENDIX 10

SCHEDULE OF FITTINGS AND ACCESSORIES

Project:

Location:

No.	Item	Description	Supplier	Qty.	Material	Size

Note : Schedule given for a reference only.

APPENDIX 11

SCHEDULE OF INTERIOR SIGNAGE

Project:

Location:

No.	Item	Description	Qty.	Size	Room/Place

Note : Schedule given for a reference only.

APPENDIX 12

SCHEDULE OF EXTERIOR SIGNAGE

Project:

Location:

No.	Item	Description	Qty.	Size	Room/Place

Note : Schedule given for a reference only.

APPENDIX 13

BIM BRIEF

Project Title:

NO.	**SCOPE OF BIM WORKS**
i.	Main Block _____
ii.	Quarters _____
iii.	Pondok Pengawal
iv.	Tnb Substation
v.	Tapak
vi.	.....

Note : Schedule given for a reference only. This list is not exhaustive and the Project Team shall include the exact item

NO.	BIM OBJECTIVES	USES	DELIVERABLES
1.	To create: Design model for interacting with clients in 3D visualisation	Design model preparation	Design Models (Architectural, Structural, Civil, Mechanical and Electrical, and Specialty Equipment)
2.	To carry out: Spatial Requirement Analysis to optimise design according to brief	Analysis space	Spatial Requirement Analysis report
3.	To generate drawings from model for documentation:	Generate drawing	a) Tender Drawings from the Design Models b) Construction Drawings from the Construction Models c) As-Built Drawings from the As-Built Models
4.	To update: Construction Models during Construction Phase	Managing project during Construction Phase	4D simulation Model
	Reduce design discrepancy	3D coordination	a) Coordinated model: - Architect - Civil - Structure - Mechanical - Electric b) Design review report c) Clash analysis report
5.	To produce: Coordinated Models of all disciplines	3D coordination	
6.	To provide: 3D visualization	3D coordination	
7.	To update and complete: As-Built Models of all disciplines	Record model	a) As Built model b) As built drawing
8.	…….		
(This list is not exhaustive and the Project Team can include other objectives)			

Note : Schedule given for a reference only.

APPENDIX 14

BIM DELIVERABLES SUMMARY

Project Title:

NO.	BIM DELIVERABLES SUMMARY
A)	**TENDER PROPOSAL PHASE:** (refer to **Section 10.10** of Tenderer's Proposal Checklist)
B)	**DETAILED DESIGN PHASE:**
1.	**Coordinated Model** a) Building works model in softcopy (.rvt & .nwc &.nwd) - Not less than LOD 300, combination of: i) Architectural Model
	ii) Structural Model
	iii) Mechanical Model
	iv) Electrical Model
C)	**CONSTRUCTION PHASE:**
1.	**Updating BIM Project Execution Plan (BPEP) as required**
2.	**Construction Model** a) Building works model in softcopy (.rvt & .nwc) - Not less than **LOD 400**, linked with related discipline: i) Architectural Model
3.	**Construction Drawing Documentation in Softcopy** To update and complete: a) For building works model in softcopy (.dwfx) (generated from the models created): i) Architectural Model
4.	**Construction Drawing Documentation in Hardcopy** a) For building works in hardcopy (generated from the models created): i) Architectural Drawings
5.	**Coordinated Model** a) Building works model in softcopy (.rvt)
	- Not less than LOD, 400 combination of: i) Architectural Model
	ii) Structural Model
	iii) Mechanical Model

NO.	BIM DELIVERABLES SUMMARY
	iv) Electrical Model
6.	**Construction Simulation Model** a) Building works model in softcopy (.nwd) - Not less than LOD, 400 combination of all related models
D)	**HANDING OVER PHASE:**
1.	**Updating BIM Project Execution Plan (BPEP) as required**
2.	**As-Built Model** a) Building works model in softcopy (.rvt & .nwd) - Not less than **LOD 500**. Shall consist of: i) Architectural Model
	ii) Architectural Family Component
3.	**As-Built Drawing Documentation in Softcopy** a) For building works model in softcopy (.dwfx) - Not less than LOD 500 (generated from the models created)
4.	**As-Built Drawings Documentation in Hardcopy** a) For building works in hardcopy - Not less than LOD 500 (generated from the models created) i) Architectural Drawings

Note : Schedule given for a reference only. It can be updated by JKR.

APPENDIX 15

LIST OF REQUIREMENTS OF THE BIM DELIVERABLES FOR ARCHITECTURAL MODEL

LIST OF REQUIREMENTS OF THE BIM DELIVERABLES: ARCHITECTURE MODEL

The following list only applies to the BIM Deliverables to be submitted from Detail Design Phase to the Handing Over Phase

A. **MODEL INTEGRITY AND QUALITY**	
No.	**Description**
1.	Architectural Model developed in accordance to specified architectural design.
2.	Architectural Model files are named according to the PWD's BIM Guidelines and Standards
3.	Architectural Model is structured according to rules that are easily managed. For example, architectural model is managed according to block, tower and podium.
4.	Architectural Model to be positioned appropriately to the *Project Base Point* preferably Grid A and 1.
5.	Architectural Model should be properly organised and using architectural *gridlines and levels*.
6.	Rooms are categorised by departments.
7.	All materials are included in model elements.

B. PROJECT INFORMATION	
No.	**Description**
1.	Project Information should be updated.

C. PROJECT BROWSER ORGANIZATION	
No.	**Description**
1.0	**Views (Architectural)**
1.1	**Views (Architectural)** created based from PWD's architectural template.
1.2	**WIP** views are used for design development and design study purposes.
1.3	**PBT** views are used for PBT submission purposes.

C. PROJECT BROWSER ORGANIZATION	
No.	**Description**
1.4	**BOMBA** views are used for BOMBA submission purposes.
1.5	**Dokumen** views are used for contract documentation, contract implementation and final completion.
1.6	Spatial and Zoning Analysis are generated from Area Plan.
2.0	**Legends**
2.1	Contents of **Legends** are managed as follows: a) Legends for Components b) General Notes
3.0	**Schedules/Quantities**
3.1	Schedules/Quantities shall be generated according to: a) Schedule of Accomodation b) Building Component Schedule c) Material Takeoff Schedule
4.0	**Sheets**
4.1	Contents of **Sheets** are architectural drawings that are managed according to the rules for architecture as follows: a) Title Block b) Drawing Title c) List of Drawings d) General Notes e) Plans f) Elevations g) Sections h) Details i) Others: _____
4.2	All architectural drawings should use JKR Title Block with furnished information.
5.0	**Link Files**
5.1	Files for the models linked with Architectural Model are correct and up-to-date

D. ARCHITECTURAL FAMILIES			
No.	**Components and System Families Category to respective components are to fullfil these criteria:** a) Component File Naming shall be in Accordance with Geometry and Standards b) Quality and Integrity c) Correct Family Category d) Information complete (parameters) e) As per Design Geometry		
1.	Floors	13.	Furniture
2.	Walls	14.	Plumbing Fixtures
3.	Ceilings	15.	Furniture Systems
4.	Roofs	16.	Specialty Equipment
5.	Stairs	17.	Generic Models
6.	Railings	18.	Columns
7.	Ramps	19.	Parking
8.	Room	20.	Pipes (rwdp)
9.	Curtain Systems	21.	Structural Column
10.	Doors	22.	Toposurface
11.	Windows	23.	Mass
12.	Caseworks		

E. PROPERTIES AND VISIBILITY GRAPHIC	
No.	**Description**
1.0	**View Template are Correctly Applied**
1.1	**BOMBA** Submission
1.2	**PBT** Submission

Appendix 16a

LIST OF ARCHITECTURAL GENERAL PARAMETERS

APPENDIX 16a:

LIST OF ARCHITECTURAL GENERAL PARAMETERS

Category: PROJECT INFORMATION

Category: **PROJECT INFORMATION**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Text					
Pengarah_Projek_jkr_sit	√	√	√	√	√
No_Fail_AR_jkr_sit	√	√	√	√	√
No_Model_BIM_AR_jkr_sit	√	√	√	√	√
Perunding_Arkitek_jkr_sit	√	√	√	√	√
Perunding_Sivil_Struktu_jkr_sit	√	√	√	√	√
Perunding_Mekanikal_Elektrikal_jkr_sit	√	√	√	√	√
Perunding_Juruukur_Bahan_jkr_sit	√	√	√	√	√
Identiti Data					
Organization Name	√	√	√	√	√
Organization Description	√	√	√	√	√
Building Name	√	√	√	√	√
Author	√	√	√	√	√
Energy Analysis			√	√	√
Energy Settings			√	√	√
Komen_jkr_six			√	√	√
URL_Kemaskini_jkr_piu			√	√	√
Butiran_Kemaskini_jkr_six			√	√	√

Category: **PROJECT INFORMATION**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
General					
Tebal_Rasuk_Struktur_Tipikal_jkr_sil		√	√	√	√
Luas_Tapak_Projek_jkr_sia		√	√	√	√
Bilangan_Bilik_Darjah_jkr_sii		√	√	√	√
Luas_Lantai_Bangunan_GFA_jkr_sia		√	√	√	√
Tinggi_Bangunan_jkr_sil		√	√	√	√
Kaedah_Perolehan_jkr_sit		√	√	√	√
Kelegaan_Siling_Tipikal_jkr_sil		√	√	√	√
Luas_Tapak_Bangunan_jkr_sia		√	√	√	√
Bilangan_Pakir_Diperlukan_jkr_sii		√	√	√	√
Kumpulan_Maksud_Bangunan_jkr_sit		√	√	√	√
Jarak_Grid_Tipikal_jkr_sil		√	√	√	√
Tinggi_Siling_Tipikal_jkr_sil		√	√	√	√
Luas_Kasar_Maksimum_jkr_sia		√	√	√	√
Bilangan_Katil_jkr_sii		√	√	√	√
Luas_Bersih_NFA_jkr_sia		√	√	√	√

Category: **PROJECT INFORMATION**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Data					
Maklumat_Tanah_jkr_sit	√	√	√	√	√
Mukim_jkr_sit	√	√	√	√	√
Kos_Siap_Bina_Asal_jkr_sic			√	√	√
Negara_jkr_sit	√	√	√	√	√
Daerah_jkr_sit	√	√	√	√	√
Kod_PTJ_jkr_sit				√	√
Kos_Tambahan_jkr_sic				√	√
Bilangan_Binaan_Luar_jkr_sit				√	√
Kos_Keseluruhan_jkr_sic				√	√
Negeri_jkr_sit	√	√	√	√	√
Tarikh_Penilaian_jkr_sit				√	√
Jabatan_jkr_sit	√	√	√	√	√
Bilangan_Blok_Bangunan_jkr_sii	√	√	√	√	√
Tarikh_Siap_Bina_jkr_sit			√	√	√
Jumlah_Keluasan_Premis_jkr_sia			√	√	√
Poskod_jkr_sit	√	√	√	√	√
Tahun_Siap_Bina_Asal_jkr_sit				√	√
Status_Premis_jkr_siy				√	√
No_DPA_jkr_sit				√	√
Sumber_Pembiayaan_jkr_sit			√	√	√
Catatan_jkr_sit	√	√	√	√	√
Kementerian_jkr_sit	√	√	√	√	√
Kategori_Premis_jkr_sit			√	√	√
Nama_Premis_jkr_sit			√	√	√

Category: **PROJECT INFORMATION**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Tinggi_Lantai_ke_Lantai_Tipikal_jkr_sil		√	√	√	√
Luas_Menurut_Brif_jkr_sia		√	√	√	√
Jenis_Rekabentuk_Struktur_jkr_sit		√	√	√	√
Bilangan_Pakir_Disediakan_jkr_sii		√	√	√	√
Saiz_Rasuk_Struktur_Tipikal_jkr_sit		√	√	√	√
Kod_DAK_Blok_jkr_sit			√	√	√
Keperluan_Bomba_jkr_six		√	√	√	√
Keperluan_PBT_jkr_six		√	√	√	√
Keperluan_Pelanggan_jkr_six		√	√	√	√
Keperluan_Rekabentuk_EL_jkr_six		√	√	√	√
Keperluan_Rekabentuk_ME_jkr_six		√	√	√	√
Keperluan_Rekabentuk_ST_jkr_six		√	√	√	√
Jenis_Premis_jkr_sit			√	√	√
Alamat_Premis_jkr_sit			√	√	√
Kumpulan_Agensi_jkr_sit			√	√	√
Nilai_Semasa_jkr_sic				√	√
Aset_Warisan_jkr_siy	√	√	√	√	√

Category: **PROJECT INFORMATION**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Others					
Project Issue Date				√	√
Project Status	√	√	√	√	√
Client Name	√	√	√	√	√
Project Address	√	√	√	√	√
Project Name	√	√	√	√	√
Project Number	√	√	√	√	√
Tarikh_Kelulusan_Bomba _jkr_sit			√	√	√
Tarikh_Kelulusan_PBT_ jkr_sit			√	√	√
Tempoh_Kontrak_jkr_sit		√	√	√	√
Tarikh_Mula_Rekabentuk _jkr_sit	√	√	√	√	√
Tarikh_Milik_Tapak_jkr_ sit				√	√
Tarikh_Siap_Projek_jkr_ sit				√	√
Kontraktor_Projek_jkr_sit		√	√	√	√
Tarikh_Tutup_Tender_jkr _sit				√	√
Tarikh_Tender_jkr_sit				√	√
Harga_Kontrak_jkr_sic				√	√
Tarikh_CMGD_jkr_sit				√	√
Tarikh_CPC_jkr_sit				√	√

Category: **MATERIAL**

Category: **MATERIAL IDENTITY**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Name		√	√	√	√
Descriptive Information					
Description		√	√	√	√
Comments			√	√	√
Keywords		√	√	√	√
Product Information					
Manufacturer				√	√
Model				√	√
Cost				√	√
URL				√	√
Revit Annotation Information					
Mark	√	√	√	√	√

Category: **MATERIAL GRAPHICS**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Shading					
Color	√	√	√	√	√
Transparency	√	√	√	√	√
Surface Pattern					
Pattern	√	√	√	√	√
Color	√	√	√	√	√
Alignment	√	√	√	√	√
Cut Pattern					
Pattern	√	√	√	√	√
Color	√	√	√	√	√

Category: **MATERIAL - APPEARANCE**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Information					
Name	√	√	√	√	√
Description	√	√	√	√	√
Keywords	√	√	√	√	√
Generic					
Color	√	√	√	√	√
Image	√	√	√	√	√
Image Fade	√	√	√	√	√
Glossiness	√	√	√	√	√
Highlights	√	√	√	√	√
Reflectivity					
Direct	√	√	√	√	√
Oblique	√	√	√	√	√
Transparency					
Amount	√	√	√	√	√
Image	√	√	√	√	√
Image Fade	√	√	√	√	√
Translucency	√	√	√	√	√
Refraction	√	√	√	√	√
Cutout					
Image	√	√	√	√	√
Self-Illumination	√	√	√	√	√
Filter Color	√	√	√	√	√
Luminance	√	√	√	√	√
Color Temperature	√	√	√	√	√
Bump					
Image	√	√	√	√	√
Amount	√	√	√	√	√

Category: **MATERIAL - APPEARANCE**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Tint					
Tint Color	√	√	√	√	√
Masonry					
Type	√	√	√	√	√
Image	√	√	√	√	√
Finish	√	√	√	√	√
Plastic					
Type	√	√	√	√	√
Color	√	√	√	√	√
Finish	√	√	√	√	√
Wall Paint					
Color	√	√	√	√	√
Finish	√	√	√	√	√
Application	√	√	√	√	√
Metal					
Type	√	√	√	√	√
Finish	√	√	√	√	√
Wood					
Image	√	√	√	√	√
Stain Color	√	√	√	√	√
Finish	√	√	√	√	√
Used For	√	√	√	√	√
Concrete					
Color	√	√	√	√	√
Sealant	√	√	√	√	√

Appearance properties other than Information depend on the type of the material asset.

Category: **MATERIAL - APPEARANCE**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Glazing					
Color	√	√	√	√	√
Reflectance	√	√	√	√	√
Sheets of Glass	√	√	√	√	√
Ceramic					
Type	√	√	√	√	√
Color	√	√	√	√	√
Finish	√	√	√	√	√

Category: MATERIAL – MATERIAL PARAMETERS					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Komen_jkr_six	√	√	√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_ jkr_sit				√	√

Category: AREA

Category: **AREA**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Constraints					
Level	√	√	√	√	√
Dimensions					
Area	√	√	√	√	√
Perimeter	√	√	√	√	√
Identity Data					
Number	√	√	√	√	√
Name	√	√	√	√	√
Room Style	√	√	√	√	√
Comments	√	√	√	√	√
Occupancy	√	√	√	√	√
Department	√	√	√	√	√
Komen_jkr_six			√	√	√
Zon_jkr_sit	√	√	√	√	√
Fungsi_jkr_sit	√	√	√	√	√
Kategori_jkr_sit	√	√	√	√	√
Kod_Kawasan_jkr_sit			√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_ jkr_sit				√	√
Other					
Dipilih_jkr_siy				√	√

Category: ROOM

Category: **ROOM**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Constraints					
Level		√	√	√	√
Upper Limit		√	√	√	√
Limit Offset		√	√	√	√
Base Offset		√	√	√	√
Text					
Diterima_jkr_siy			√	√	√
Kategori_jkr_sit		√	√	√	√
Bilangan_Ruang_jkr_sii		√	√	√	√
Zon_jkr_sit			√	√	√
Gred_Jawatan_jkr_sit			√	√	√
Bilangan_No_jkr_sit		√	√	√	√
Luas_Brif_jkr_sia		√	√	√	√
Bahagian_jkr_sit		√	√	√	√
Unit_jkr_sit		√	√	√	√

Category: **ROOM**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Electrical					
C0101_Network_Points_jkr_six			√	√	√
C0201_Telephone_jkr_six			√	√	√
C0301_Computer_jkr_six			√	√	√
C0401_PACS_Workstation_jkr_six			√	√	√
C0501_Printers_jkr_six			√	√	√
C0601_Miscellaneous_jkr_six			√	√	√
D0201_Sistem_Pengudaraan_jkr_six			√	√	√
D0301_Puncakuasa_jkr_six			√	√	√
D0401_Sistem_Siaraya_jkr_six			√	√	√
D0501_Sistem_MATV_jkr_six			√	√	√
D0601_Digital_Calling_System_jkr_six			√	√	√
D0701_Nurse_Calling_System_jkr_six			√	√	√
D0801_Audio_Visual_System_jkr_six			√	√	√
D0901_CCTV_System_jkr_six			√	√	√
D0902_Access_System_jkr_six			√	√	√
D0903_Intercom_jkr_six			√	√	√
D0101_Pencahayaan_jkr_six			√	√	√
Mechanical					
B0101_Gas_Piping_jkr_six			√	√	√
B0102_Type_Of_Outlet_jkr_six			√	√	√
B0201_Pencegah_Kebakaran_jkr_six			√	√	√
B0301_Ventilation_jkr_six			√	√	√
B0302_Air_Conditioning_jkr_six			√	√	√
B0303_Air_Conditioning_Usage_jkr_six			√	√	√
B0401_Keperluan_Air_Dan_Sanitari_jkr_six			√	√	√
B0501_Pneumatic_Tube_jkr_six			√	√	√
B0601_Special_Requirement_jkr_six			√	√	√
Dimensions					
Area	√	√	√	√	√
Perimeter	√	√	√	√	√
Unbounded Height	√	√	√	√	√
Volume	√	√	√	√	√
Computation Height	√	√	√	√	√
Other					
Aras_Lantai_jkr_sin		√	√	√	√
Warna_Aras_jkr_sit		√	√	√	√

Category: **ROOM**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Number		√	√	√	√
Name		√	√	√	√
Room Style		√	√	√	√
Comments		√	√	√	√
Occupancy		√	√	√	√
Department		√	√	√	√
Base Finish		√	√	√	√
Ceiling Finish		√	√	√	√
Wall Finish		√	√	√	√
Floor Finish		√	√	√	√
Occupant		√	√	√	√
Tinggi_Siling_jkr_sil		√	√	√	√
Label_Ruang_jkr_sit			√	√	√
Komen_jkr_six			√	√	√
Kod_Kambi_jkr_sit		√	√	√	√
Sistem_Pengudaraan_jkr_sit		√	√	√	√
Kod_Ruang_jkr_stt		√	√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_jkr_sit				√	√
Data					
A0501_Hatch_Pass_Through_Counter_jkr_six			√	√	√
A0601_Sinage_jkr_six			√	√	√
A1301_Others_jkr_six			√	√	√
F0101_Remark_jkr_six			√	√	√
Kod_DAK_Lokasi_jkr_sit			√	√	√

Category: SHEETS
/ TITLE BLOCK

Category: **SHEETS / TITLE BLOCK**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Graphic					
Visibility/Graphics Overrides		√	√	√	√
Scale		√	√	√	√
Text					
Nama_Bilik_jkr_sit			√	√	√
Sistem_Elektrik_jkr_sit			√	√	√
Kod_Bilik_jkr_sit		√	√	√	√
Jabatan_jkr_sit			√	√	√
Tarikh_jkr_sit		√	√	√	√
Bilangan_Pengguna_jkr_sii			√	√	√
Kod_Lukisan_jkr_sit		√	√	√	√
Sistem_Mekanikal_jkr_sit			√	√	√
Bilangan_Pindaan_jkr_sit			√	√	√
Layout_Drawing_jkr_sit		√	√	√	√
No_Lukisan_jkr_sit		√	√	√	√
No_Lukisan_Elektronik_jkr_sit		√	√	√	√
Muka_Surat_jkr_sit		√	√	√	√
Bilangan_Lukisan_jkr_sit		√	√	√	√

Category: **SHEETS / TITLE BLOCK**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Dependency		√	√	√	√
Referencing Sheet		√	√	√	√
Referencing Detail		√	√	√	√
Current Revision Issued		√	√	√	√
Current Revision Issued By		√	√	√	√
Current Revision Issued To			√	√	√
Current Revision Date		√	√	√	√
Current Revision Description		√	√	√	√
Current Revision		√	√	√	√
Approved By		√	√	√	√
Designed By		√	√	√	√
Checked By		√	√	√	√
Drawn By		√	√	√	√
Sheet Number		√	√	√	√
Sheet Name		√	√	√	√
Sheet Issue Date		√	√	√	√
Nota_jkr_six		√	√	√	√
Appears In Sheet List		√	√	√	√
Revisions on Sheet			√	√	√
Visibility					
Sheet_jkr_pit				√	√
Jenis_Lukisan_jkr_pit				√	√
Other					
File Path				√	√
Guide Grid				√	√

APPENDIX 16b

LIST OF ARCHITECTURAL FAMILY CATEGORY PARAMETERS

APPENDIX 16b:

LIST OF ARCHITECTURAL FAMILY CATEGORY PARAMETERS

Family Category: CASEWORK

Family Category: **CASEWORK**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Kod_Jenis_jkr_stt			√	√	√
Kod_Rekabentuk_jkr_stt			√	√	√
Kod_Saiz_jkr_stt			√	√	√
MS1064_jkr_sty			√	√	√
Ruang_Berkaitan_jkr_stt			√	√	√
Kod_Tinggi_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Material & Finishes					
Bahan_jkr_stm			√	√	√
Bahan_jkr_stt			√	√	√
Finish			√	√	√
Kaca_jkr_stm			√	√	√
Kaca_jkr_stt			√	√	√
Kaki_jkr_stm			√	√	√
Kaki_jkr_stt			√	√	√
Kemasan_jkr_stm			√	√	√
Kemasan_jkr_stt			√	√	√
Kod Bahan_jkr_stt			√	√	√
Kod Kaca_jkr_stt			√	√	√
Kod Kemasan_jkr_stt			√	√	√
Kod Panel_jkr_stt			√	√	√
Kod_Permukaan_Meja_jkr_stt			√	√	√

Family Category: **CASEWORK**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Tarikh_Kelulusan_APK_jkr_sit				√	√
Butiran_APK_jkr_six				√	√
Data					
No_Pesanan_Rasmi_Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh _Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
No_Siri_jkr_sit				√	√
Alamat_Kontraktor_jkr_six				√	√
Alamat_Pembekal_jkr_six				√	√
ID_Komponen_jkr_sit					√
Kod_DAK_Lokasi_jkr_sit				√	√

Family Category: **CASEWORK**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Panel_jkr_stm			√	√	√
Panel_jkr_stt			√	√	√
Permukaan Meja_jkr _stm			√	√	√
Permukaan Meja_jkr_stt			√	√	√
Dimensions					
Depth	√	√	√	√	√
Height	√	√	√	√	√
Width	√	√	√	√	√
Identity Data					
Description		√	√	√	√
Huraian_BQ_jkr_stx			√	√	√
Model				√	√
Manufafacturer				√	√
Kod_Komponen_Projek _jkr_stt	√	√	√	√	√
Kumpulan_Peralatan_jkr_s ti			√	√	√
Spesifikasi_jkr_stx			√	√	√
Kaedah_Perolehan_jkr _stt					
Model Properties					
No_Lukisan_Butiran_jkr_ stt			√	√	√
No_Lukisan_Elektronik_jkr _stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_j kr_stt	√	√	√	√	√
Projek_Asal_jkr_stt		√	√	√	√

Note: ID_Komponen_jkr_sit information is required after project hand over

Family Category: **CASEWORK**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
General					
Nota_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_ stx			√	√	√
Panduan_Revit_jkr_stx			√	√	√
Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_ stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_ stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Family Category: CEILING

Family Category: **CEILING**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Structure		√	√	√	√
Kod_Jenis_jkr_stt			√	√	√
MS1064_jkr_sty			√	√	√
Komponen_IBS_jkr_sty			√	√	√
Kod_Kedudukan_jkr_stt			√	√	√
Ruang_Berkaitan_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Graphic					
Warna_Kelulusan_PBT_jkr_stt			√	√	√
Material & Finishes					
Kod_Kemasan_jkr_stt			√	√	√
Kod_Bahan_jkr_stt			√	√	√
Bahan_jkr_stt			√	√	√
Kemasan_jkr_stt			√	√	√
Identity Data					
Model				√	√
Manufacturer				√	√
Description		√	√	√	√
Kod_Komponen_Projek_jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√
Model Properties					
Projek_Asal_jkr_stt			√	√	√
No_Lukisan_Elektronik_jkr_stt			√	√	√
No_Lukisan_Butiran_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_Jkr_stt	√	√	√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_stx			√	√	√
Nota_jkr_stx			√	√	√

Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Constrains					
Level	√	√	√	√	√
Height Offset From Level	√	√	√	√	√
Room Bounding	√	√	√	√	√
Dimensions					
Slope	√	√	√	√	√
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_jkr_sit				√	√
Data					
No_Pesanan_Rasmi_Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh_Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
Alamat_Kontraktor_jkr_six				√	√
Alamat_Pembekal_jkr_six				√	√
ID_Komponen_jkr_sit					√
Kod_DAK_Lokasi_jkr_sit				√	√

Family Category: COLUMN

Family Category: **COLUMN**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Komponen_IBS_jkr_sty			√	√	√
Kod_Jenis_jkr_stt			√	√	√
MS_1064_jkr_sty			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Graphic					
Warna_Kelulusan_PBT_jkr_stt			√	√	√
Material & Finishes					
Kod_Kemasan_jkr_stt			√	√	√
Kod_Bahan_jkr_stt			√	√	√
Bahan_jkr_stm			√	√	√
Bahan_jkr_stt			√	√	√
Kemasan_jkr_stt			√	√	√
Kemasan_jkr_stm			√	√	√
Dimensions					
Depth			√	√	√
Width			√	√	√
Identity Data					
Model				√	√
Manufacturer				√	√
Description		√	√	√	√
Kod_Komponen_Projek_jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√

Family Category: **COLUMN**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Constrains					
Base Level			√	√	√
Top Level			√	√	√
Room Bounding			√	√	√
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_jkr_sit				√	√
Data					
No_Pesanan_Rasmi_Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh _Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
Alamat_Kontraktor_jkr_six				√	√
Alamat_Pembekal_jkr_six				√	√
ID_Komponen_jkr_sit					√
Kod_DAK_Lokasi_jkr_sit				√	√

Note: Data Information is required when using Decorative Column and finishes that does not involve structural analysis.

Family Category: **COLUMN**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Model Properties					
Projek_Asal_jkr_stt		√	√	√	√
No_Lukisan_Elektronik_jkr_stt			√	√	√
No_Lukisan_Butiran_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_jkr_stt	√	√	√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_stx			√	√	√
Nota_jkr_stx			√	√	√
Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Note: Data Information is required for finishes and when using Decorative Column that does not involve structural analysis

Note: ID_Komponen_jkr_sit information is required after project hand over.

Family Category: DOOR

Family Category: **DOOR**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Function			√	√	√
Kekisi_jkr_sty		√	√	√	√
Kod_Ciri_Komponen _jkr_ stx	√	√	√	√	√
Kod_Kedudukan_jkr_stt			√	√	√
Kod_Kekisi_jkr_stt			√	√	√
Kekisi_jkr_stt			√	√	√
Kod_Rekabentuk_jkr_stt			√	√	√
Kod_Saiz_jkr_stt			√	√	√
Komponen_Bomba_jkr_ sty			√	√	√
Kod_Jenis_jkr_stt		√	√	√	√
MS1064_jkr_sty			√	√	√
Ruang_Berkaitan_jkr_stt			√	√	√
Graphic					
Warna_Kelulusan_PBT_ jkr_stt			√	√	√
Material & Finishes					
Bingkai_jkr_stm			√	√	√
Bingkai_jkr_stt			√	√	√
Kaca_jkr_stm			√	√	√
Kaca_jkr_stt			√	√	√
Kemasan_Bingkai_jkr_stt			√	√	√
Kemasan_Panel_jkr_stt			√	√	√
Kod_Bingkai_jkr_stt			√	√	√
Kod_Kaca_jkr_stt			√	√	√
Kod_Panel_jkr_stt			√	√	√
Panel_jkr_stm			√	√	√
Panel_jkr_stt			√	√	√
Dimensions					
Width	√	√	√	√	√
Height	√	√	√	√	√

Family Category: **DOOR**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Constraints					
Level			√	√	√
Construction					
Kumpulan_Ironmongery_ jkr_sii			√	√	√
Ironmongery_jkr_six			√	√	√
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Tarikh_Kelulusan_APK_ jkr_sit				√	√
Butiran_APK_jkr_six				√	√
Data					
No_Pesanan_Rasmi_ Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_ jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh_Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_ sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
No_Siri_jkr_sit				√	√
Alamat_Kontraktor_jkr_ six				√	√
Alamat_Pembekal_jkr_ six				√	√
ID_Komponen_jkr_sit					√
Kod_DAK_Lokasi_jkr_sit				√	√

Family Category: **DOOR**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Model				√	√
Manufacturer				√	√
Description		√	√	√	√
Fire Rating			√	√	√
Huraian_BQ_jkr_stx			√	√	√
Kod_Komponen_Projek_jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Model Properties					
No_Lukisan_Butiran_jkr_stt			√	√	√
No_Lukisan_Elektronik_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_jkr_stt	√	√	√	√	√
Projek_Asal_jkr_stt			√	√	√
General					
Nota_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_stx			√	√	√
Panduan_Revit_jkr_stx			√	√	√
Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Note: ID_Komponen_jkr_sit information is required after project hand over.

Family Category: ELECTRICAL EQUIPMENT / ELECTRICAL FIXUTURES / FIRE ALARM DEVICES / LIGHTING FIXTURES

Family Category: **ELECTRICAL EQUIPMENT / ELECTRICAL FIXTURES / FIRE ALARM DEVICES / LIGHTING FIXTURES**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Komponen_Bomba _jkr_sty			√	√	√
Kod_Jenis_jkr_stt			√	√	√
Ruang_Berkaitan_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_ stx	√	√	√	√	√
Saiz_Fizikal_jkr_stt			√	√	√
Identity Data					
Description		√	√	√	√
Huraian_BQ_jkr_stx			√	√	√
Spesifikasi_jkr_stx			√	√	√
Kaedah_Perolehan_jkr_stt			√	√	√
Kod_Komponen_Projek_ jkr_stt	√	√	√	√	√
Model Properties					
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_j kr_stt	√	√	√	√	√
Projek_Asal_jkr_stt			√	√	√
General					
Nota_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_ stx			√	√	√
Panduan_Revit_jkr_stx			√	√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Family Category: **ELECTRICAL EQUIPMENT / ELECTRICAL FIXTURES / FIRE ALARM DEVICES / LIGHTING FIXTURES**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Tarikh_Kelulusan_APK_jkr _sit				√	√
Butiran_APK_jkr_six				√	√

Family Category: FLOOR

Family Category: **FLOOR**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Structure		√	√	√	√
Function			√	√	√
Komponen_IBS_jkr_sty			√	√	√
Kod_Jenis_jkr_stt			√	√	√
MS1064_jkr_sty			√	√	√
Kod_Kedudukan_jkr_stt			√	√	√
Ruang_Berkaitan_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Material & Finishes					
Kod_Kemasan_jkr_stt			√	√	√
Kod_Bahan_jkr_stt			√	√	√
Bahan_jkr_stt		√	√	√	√
Kemasan_jkr_stt		√	√	√	√
Kemasan_Bawah_jkr_stt			√	√	√
Kod_Kemasan_Bawah_jkr_stt			√	√	√
Lapisan_Kalis_Air_jkr_stx			√	√	√
Lapisan_Kalis_Air_jkr_sty		√	√	√	√
Identity Data					
Model				√	√
Manufacturer				√	√
Description		√	√	√	√
Kod_Komponen_Projek_jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√

Family Category: **FLOOR**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Constrains					
Level	√	√	√	√	√
Height Offset From Level	√	√	√	√	√
Room Bounding	√	√	√	√	√
Graphics					
Warna_Kelulusan_PBT_jkr_sit			√	√	√
Dimensions					
Slope			√	√	√
Identity Data					
Komen_jkr_six		√	√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_jkr_sit				√	√
Other					
Warna_Aras_jkr_sit		√	√	√	√

Family Category: **FLOOR**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Model Properties					
No_Lukisan_Elektronik_jkr_stt			√	√	√
No_Lukisan_Butiran_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_jkr_stt	√	√	√	√	√
Projek_Asal_jkr_stt			√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_stx			√	√	√
Nota_jkr_stx			√	√	√
Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Note: Data Information is required when using floor finishes.

Family Category: **FLOOR**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Data					
No_Pesanan_Rasmi_Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh_Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
Alamat_Kontraktor_jkr_six				√	√
Alamat_Pembekal_jkr_six				√	√
ID_Komponen_jkr_stt					√
Kod_DAK_Lokasi_jkr_sit				√	√

Family Category: FURNITURE

Family Category: **FURNITURE**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Saiz_Fizikal_jkr_stt			√	√	√
Kod_Jenis_jkr_stt			√	√	√
Kod_Rekabentuk_jkr_stt			√	√	√
Kod_Saiz_jkr_stt			√	√	√
Kod_Tinggi_jkr_stt					
MS1064_jkr_sty			√	√	√
Ruang_Berkaitan_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Material & Finishes					
Kaca_jkr_stt			√	√	√
Panel_jkr_stm			√	√	√
Kaca_jkr_stm			√	√	√
Kaki_jkr_stm			√	√	√
Permukaan_Meja_jkr_stm			√	√	√
Kod_Kemasan_jkr_stt			√	√	√
Kod_Bahan_jkr_stt			√	√	√
Bahan_jkr_stm			√	√	√
Kod_Panel_jkr_stt			√	√	√
Kod_Permukaan_Meja_jkr_stt			√	√	√
Kod_Kaca_jkr_stt			√	√	√
Permukaan_Meja_jkr_stt			√	√	√
Bahan_jkr_stt			√	√	√
Kemasan_jkr_stt			√	√	√
Kemasan_jkr_stm			√	√	√
Kaki_jkr_stt			√	√	√
Panel_jkr_stt			√	√	√
Dimensions					
Panjang_jkr_stl		√	√	√	√
Lebar_jkr_stl		√	√	√	√
Tinggi_jkr_stl		√	√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_stx			√	√	√
Nota_jkr_stx			√	√	√

Family Category: **FURNITURE**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Model				√	√
Manufacturer				√	√
Description		√	√	√	√
Kod_Komponen_Projek_jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√
Kumpulan_Peralatan_jkr_sti			√	√	√
Kaedah_Perolehan_jkr_stt			√	√	√
Model Properties					
Projek_Asal_jkr_stt			√	√	√
No_Lukisan_Butiran_jkr_stt			√	√	√
No_Lukisan_Elektronik_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_jkr_stt	√	√	√	√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Family Category: **FURNITURE**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_jkr_sit				√	√

Family Category: FURNITURE SYSTEM

Family Category: **FURNITURE SYSTEM**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Saiz_Fizikal_jkr_stt			√	√	√
Kod_Jenis_jkr_stt			√	√	√
Kod_Rekabentuk_jkr_stt			√	√	√
MS1064_jkr_sty			√	√	√
Kod_Saiz_jkr_stt			√	√	√
Kod_Tinggi_jkr_stt			√	√	√
Ruang_Berkaitan_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Material & Finishes					
Kaca_jkr_stt			√	√	√
Panel_jkr_stm			√	√	√
Kaca_jkr_stm			√	√	√
Kaki_jkr_stm			√	√	√
Permukaan_Meja_jkr_stm			√	√	√
Kod_Kemasan_jkr_stt			√	√	√
Kod_Bahan_jkr_stt			√	√	√
Bahan_jkr_stm			√	√	√
Kod_Panel_jkr_stt			√	√	√
Kod_Permukaan_Meja_jkr_stt			√	√	√
Kod_Kaca_jkr_stt			√	√	√
Permukaan_Meja_jkr_stt			√	√	√
Bahan_jkr_stt			√	√	√
Kemasan_jkr_stt			√	√	√
Kemasan_jkr_stm			√	√	√
Kaki_jkr_stt			√	√	√
Panel_jkr_stt			√	√	√
Dimensions					
Panjang_jkr_stl	√	√	√	√	√
Lebar_jkr_stl	√	√	√	√	√
Tinggi_jkr_stl	√	√	√	√	√

Family Category: **FURNITURE SYSTEM**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_jkr_sit				√	√
Data					
No_Pesanan_Rasmi_Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh _Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
No_Siri_jkr_sit				√	√
Alamat_Kontraktor_jkr_six				√	√
Alamat_Pembekal_jkr_six				√	√
ID_Komponen_jkr_sit					√
Kod_DAK_Lokasi_jkr_sit				√	√

Note: ID_Komponen_jkr_sit information is required after project hand over.

Family Category: **FURNITURE SYSTEM**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Model				√	√
Manufacturer				√	√
Description		√	√	√	√
Kod_Komponen_Projek_jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√
Kumpulan_Peralatan_jkr_sti			√	√	√
Kaedah_Perolehan_jkr_stt			√	√	√
Model Properties					
No_Lukisan_Butiran_jkr_stt			√	√	√
No_Lukisan_Elektronik_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Projek_Asal_jkr_stt			√	√	√
Kod_Komponen_Sumber_jkr_stt	√	√	√	√	√
General					
Nota_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_stx			√	√	√
Panduan_Revit_jkr_stx			√	√	√

Family Category: **FURNITURE SYSTEM**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Family Category: GENERIC MODEL

Family Category: **GENERIC MODEL**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Komponen_IBS_jkr_sty			√	√	√
Kod_Jenis_jkr_stt			√	√	√
Kod_Rekabentuk_jkr_stt			√	√	√
Kod_Saiz_jkr_stt			√	√	√
MS1064_jkr_sty			√	√	√
Ruang_Berkaitan_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Material & Finishes					
Kod_Kemasan_jkr_stt			√	√	√
Kod_Bahan_jkr_stt			√	√	√
Bahan_jkr_stm			√	√	√
Bahan_jkr_stt			√	√	√
Kemasan_jkr_stt			√	√	√
Kemasan_jkr_stm			√	√	√
Kaca_jkr_stt			√	√	√
Kaca_jkr_stm			√	√	√
Kod_kaca_jkr_stt			√	√	√
Dimensions					
Panjang_jkr_stl	√	√	√	√	√
Lebar_jkr_stl	√	√	√	√	√
Tinggi_jkr_stl	√	√	√	√	√

Family Category: **GENERIC MODEL**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Tarikh_Kelulusan_APK_jkr_sit				√	√
Butiran_APK_jkr_six				√	√
Data					
No_Pesanan_Rasmi_Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh_Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
No_Siri_jkr_sit				√	√
Alamat_Kontraktor_jkr_six				√	√
Alamat_Pembekal_jkr_six				√	√
ID_Komponen_jkr_sit					√
Kod_DAK_Lokasi_jkr_sit				√	√

Note: Data Information is required when component is considered as Unmovable Asset.

ID_Komponen_jkr_sit information is required after project hand over.

Family Category: **GENERIC MODEL**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Model				√	√
Manufacturer				√	√
Description		√	√	√	√
Kod_Komponen_Projek_jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√
Kumpulan_Peralatan_jkr_sti			√	√	√
Kaedah_Perolehan_jkr_stt			√	√	√
Model Properties					
No_Lukisan_Butiran_jkr_stt			√	√	√
No_Lukisan_Elektronik_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Projek_Asal_jkr_stt			√	√	√
Kod_Komponen_Sumber_Jkr_stt	√	√	√	√	√
General					
Nota_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_stx			√	√	√
Panduan_Revit_jkr_stx			√	√	√

Family Category: **GENERIC MODEL**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Family Category: MECHANICAL EQUIPMENT

Family Category: **MECHANICAL EQUIPMENT**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Komponen_Bomba_jkr_sty			√	√	√
Kod_Jenis_jkr_stt			√	√	√
Ruang_Berkaitan_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Saiz_Fizikal_jkr_stt			√	√	√
Identity Data					
Description		√	√	√	√
Kod_Komponen_Projek_jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√
Kumpulan_Peralatan_jkr_sti			√	√	√
Kaedah_Perolehan_jkr_stt			√	√	√
Model Properties					
Projek_Asal_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_Jkr_stt	√	√	√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_stx			√	√	√
Nota_jkr_stx			√	√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Family Category: **MECHANICAL EQUIPMENT**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_jkr_sit				√	√

Family Category: PLANTING

Family Category: **PLANTING**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Kod_Jenis_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_ stx			√	√	√
Graphic					
Warna_Kelulusan_PBT_ jkr_stt			√	√	√
Dimensions					
Height			√	√	√
Diameter_jkr_stl			√	√	√
Identity Data					
Model				√	√
Manufacturer				√	√
Description		√	√	√	√
Kod_Komponen_Projek_ jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√
Kaedah_Perolehan_jkr_ stt			√	√	√
Model Properties					
Projek_Asal_jkr_stt			√	√	√
No_Lukisan_Elektronik_ jkr_stt			√	√	√
No_Lukisan_Butiran_jkr_ stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_ Jkr_stt	√	√	√	√	√
General					
Nota_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_ stx			√	√	√
Panduan_Revit_jkr_stx			√	√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Family Category: **PLANTING**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_jkr _sit				√	√

Family Category: PLUMBING FIXTURES

Family Category: **PLUMBING FIXTURES**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Kod_Jenis_jkr_stt			√	√	√
Ruang_Berkaitan_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_stx			√	√	√
Saiz_Fizikal_jkr_stt			√	√	√
Identity Data					
Model				√	√
Manufacturer				√	√
Description		√	√	√	√
Kod_Komponen_Projek_jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√
Kumpulan_Peralatan_jkr_sti			√	√	√
Kaedah_Perolehan_jkr_stt			√	√	√
Model Properties					
Projek_Asal_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_jkr_stt			√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_stx			√	√	√
Nota_jkr_stx			√	√	√
Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Family Category: **PLUMBING FIXTURES**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_jkr_sit				√	√
Data					
No_Pesanan_Rasmi_Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh_Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
No_Siri_jkr_sit				√	√
Kapasiti_jkr_sit				√	√
Alamat_Kontraktor_jkr_six				√	√
Alamat_Pembekal_jkr_six				√	√
ID_Komponen_jkr_sit					√
Kod_DAK_Lokasi_jkr_sit				√	√

Note: ID_Komponen_jkr_sit information is required after project hand over.

Family Category: RAILING

Family Category: **RAILING**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Kod_Jenis_jkr_stt			√	√	√
Kod_Rekabentuk_jkr_stt			√	√	√
MS1064_jkr_sty			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Graphic					
Warna_Kelulusan_PBT_jkr_stt			√	√	√
Material & Finishes					
Kod_Kemasan_jkr_stt			√	√	√
Kod_Bahan_jkr_stt			√	√	√
Bahan_jkr_stt			√	√	√
Kemasan_jkr_stt			√	√	√
Top Rail					
Height	√	√	√	√	√
Type	√	√	√	√	√
Identity Data					
Model				√	√
Manufacturer				√	√
Description		√	√	√	√
Kod_Komponen_Projek_jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√
Model Properties					
Projek_Asal_jkr_stt			√	√	√
No_Lukisan_Elektronik_jkr_stt			√	√	√
No_Lukisan_Butiran_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_Jkr_stt	√	√	√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_stx			√	√	√
Nota_jkr_stx			√	√	√

Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Family Category: **RAILING**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_jkr_sit				√	√
Data					
No_Pesanan_Rasmi_Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh_Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
Alamat_Kontraktor_jkr_six				√	√
Alamat_Pembekal_jkr_six				√	√
ID_Komponen_jkr_sit					√
Kod_DAK_Lokasi_jkr_sit				√	√

ID_Komponen_jkr_sit information is required after project hand over.

Family Category: RAMP

Family Category: **RAMP**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Thickness		√	√	√	√
Function			√	√	√
Komponen_IBS_jkr_sty			√	√	√
Kod_Jenis_jkr_stt			√	√	√
MS1064_jkr_sty			√	√	√
Kod_Kedudukan_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Graphic					
Warna_Kelulusan_PBT_jkr_stt			√	√	√
Material & Finishes					
Ramp Material			√	√	√
Kod_Kemasan_jkr_stt			√	√	√
Kod_Bahan_jkr_stt			√	√	√
Bahan_jkr_stt			√	√	√
Kemasan_jkr_stt			√	√	√
Identity Data					
Model			√	√	√
Manufacturer			√	√	√
Description		√	√	√	√
Kod_Komponen_Projek_jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√

Family Category: **RAMP**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Constraints					
Base Level	√	√	√	√	√
Top Level	√	√	√	√	√
Multistory Top Level	√	√	√	√	√
Dimensions					
Width	√	√	√	√	√
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_jkr_sit				√	√
Data					
No_Pesanan_Rasmi_Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh_Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
Alamat_Kontraktor_jkr_six				√	√
Alamat_Pembekal_jkr_six				√	√
ID_Komponen_jkr_stt					√
Kod_DAK_Lokasi_jkr_sit				√	√

Family Category: **RAMP**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Model Properties					
Projek_Asal_jkr_stt			√	√	√
No_Lukisan_Elektronik_jkr_stt			√	√	√
No_Lukisan_Butiran_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_Jkr_stt	√	√	√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_stx			√	√	√
Nota_jkr_stx			√	√	√
Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Family Category: ROOF

Family Category: **ROOF**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Structure		√	√	√	√
Komponen_IBS_jkr_sty			√	√	√
Kod_Jenis_jkr_stt			√	√	√
Kod_Rekabentuk_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_ stx	√	√	√	√	√
Graphic					
Warna_Kelulusan_PBT_ jkr_stt			√	√	√
Material & Finishes					
Kod_Kemasan_jkr_stt			√	√	√
Kod_Bahan_jkr_stt			√	√	√
Bahan_jkr_stt			√	√	√
Kemasan_jkr_stt			√	√	√
Lapisan_Kalis_Air_jkr_stx			√	√	√
Lapisan_Kalis_Air_jkr_sty		√	√	√	√
Identity Data					
Model				√	√
Manufacturer				√	√
Description		√	√	√	√
Kod_Komponen_Projek_ jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√

Family Category: **ROOF**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Dimensions					
Slope	√	√	√	√	√
Identity Data					
Komen_jkr_six		√	√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_ jkr_sit				√	√
Data					
No_Pesanan_Rasmi_ Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_ jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh_Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_ sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
Alamat_Kontraktor_jkr_ six				√	√
Alamat_Pembekal_jkr_ six				√	√
ID_Komponen_jkr_sit					√
Kod_DAK_Lokasi_jkr_sit				√	√

Note: ID_Komponen_jkr_sit information is required after project hand over.

Family Category: **ROOF**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Model Properties					
Projek_Asal_jkr_stt			√	√	√
No_Lukisan_Elektronik_ jkr_stt			√	√	√
No_Lukisan_Butiran_jkr_ stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_ Jkr_stt	√	√	√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_ stx			√	√	√
Nota_jkr_stx			√	√	√
Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_ stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_ stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Family Category: SHAFT OPENING

Family Category: **SHAFT OPENING**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Constraints					
Base Constraint			√	√	√
Top Constraint			√	√	√
Construction					
Kod_Ciri_Komponen_jkr_six	√	√	√	√	√
Identity Data					
Komen_jkr_six			√	√	√
Kod_Komponen_Projek_jkr_sit	√	√	√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_jkr_sit				√	√

Family Category: SPECIALTY EQUIPMENT

Family Category: **SPECIALTY EQUIPMENT**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Saiz_Fizikal_jkr_stt			√	√	√
Kod_Jenis_jkr_stt			√	√	√
Kod_Rekabentuk_jkr_stt			√	√	√
MS1064_jkr_sty			√	√	√
Kod_Saiz_jkr_stt			√	√	√
Kod_Tinggi_jkr_stt			√	√	√
Ruang_Berkaitan_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Material & Finishes					
Kaca_jkr_stt			√	√	√
Kaca_jkr_stm			√	√	√
Kod_Kemasan_stt_stm			√	√	√
Kod_Bahan_jkr_stt			√	√	√
Bahan_jkr_stm			√	√	√
Kod_Kaca_jkr_stt			√	√	√
Bahan_jkr_stt			√	√	√
Kemasan_jkr_stt			√	√	√
Kemasan_jkr_stm			√	√	√
Dimensions					
Panjang_jkr_stl	√	√	√	√	√
Lebar_jkr_stl	√	√	√	√	√
Tinggi_jkr_stl	√	√	√	√	√

Family Category: **SPECIALTY EQUIPMENT**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Tarikh_Kelulusan_APK_jkr_sit				√	√
Butiran_APK_jkr_six				√	√
Data					
No_Pesanan_Rasmi_Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh_Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
No_Siri_jkr_sit				√	√
Alamat_Kontraktor_jkr_six				√	√
Alamat_Pembekal_jkr_six				√	√
ID_Komponen_jkr_sit					√
Kod_DAK_Lokasi_jkr_sit				√	√

Note: Data Information is required when component is considered as Unmovable Asset.

Family Category: **SPECIALTY EQUIPMENT**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Model				√	√
Manufacture				√	√
Description		√	√	√	√
Kod_Komponen_Projek_jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√
Kumpulan_Peralatan_jkr_sti			√	√	√
Kaedah_Perolehan_jkr_stt			√	√	√
Model Properties					
Projek_Asal_jkr_stt			√	√	√
No_Lukisan_Elektronik_jkr_stt			√	√	√
No_Lukisan_Butiran_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_Jkr_stt	√	√	√	√	√
General					
Panduan_Rekabentuk_jkr_stx			√	√	√
Panduan_Revit_jkr_stx			√	√	√
Nota_jkr_stx			√	√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

ID_Komponen_jkr_sit information is required after project hand over.

Family Category: **SPECIALTY EQUIPMENT**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_stt				√	√

Family Category: STAIRCASE

Family Category: **STAIRCASE**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Calculation Rules					
Maximum Riser Height		√	√	√	√
Minimum Tread Depth		√	√	√	√
Minimum Run Width		√	√	√	√
Construction					
Run Type			√	√	√
Landing Type			√	√	√
Function			√	√	√
Komponen_Bomba_jkr_sty			√	√	√
Komponen_IBS_jkr_sty			√	√	√
Kod_Jenis_jkr_stt			√	√	√
Kod_Rekabentuk_jkr_stt			√	√	√
MS1064_jkr_sty			√	√	√
Kod_Kedudukan_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Graphic					
Warna_Kelulusan_PBT_jkr_stt			√	√	√
Material & Finishes					
Kod_Kemasan_jkr_stt			√	√	√
Kod_Bahan_jkr_stt			√	√	√
Bahan_jkr_stt			√	√	√
Kemasan_jkr_stt			√	√	√
Dimensions					
Panjang_jkr_stl	√	√	√	√	√
Lebar_jkr_stl	√	√	√	√	√
Tinggi_jkr_stl	√	√	√	√	√
Identity Data					
Model				√	√
Manufacturer				√	√
Description		√	√	√	√
Kod_Komponen_Projek_jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√

Family Category: **STAIRCASE**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Constrains					
Base Level		√	√	√	√
Base Offset		√	√	√	√
Top Level		√	√	√	√
Multistory Top Level		√	√	√	√
Dimensions					
Desired Number of Risers		√	√	√	√
Actual Tread Depth		√	√	√	√
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Tarikh_Kelulusan_APK_jkr_sit				√	√
Butiran_APK_jkr_six				√	√

Family Category: **STAIRCASE**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Model Properties					
Projek_Asal_jkr_stt			√	√	√
No_Lukisan_Elektronik_ jkr_stt			√	√	√
No_Lukisan_Butiran_jkr_st t			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_ Jkr_stt	√	√	√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_ stx			√	√	√
Nota_jkr_stx			√	√	√
Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_ stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_ stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Family Category: **STAIRCASE**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Data					
No_Pesanan_Rasmi_ Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_ jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh_Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_ sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
Alamat_Kontraktor_jkr_ six				√	√
Alamat_Pembekal_jkr_ six				√	√
ID_Komponen_jkr_stt					√
Kod_DAK_Lokasi_jkr_sit				√	√

Note: Data Information required related to floor finishes.

Family Category: STRUCTURAL COLUMN

Family Category: **STRUCTURAL COLUMN**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Komponen_IBS_jkr_sty			√	√	√
Kod_Jenis_jkr_stt			√	√	√
MS1064_jkr_sty			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Graphic					
Warna_Kelulusan_PBT_jkr_stt			√	√	√
Material & Finishes					
Kod_Kemasan_jkr_stt			√	√	√
Kod_Bahan_jkr_stt			√	√	√
Bahan_jkr_stm			√	√	√
Bahan_jkr_stt			√	√	√
Kemasan_jkr_stt			√	√	√
Kemasan_jkr_stm			√	√	√
Dimensions					
b	√	√	√	√	√
h	√	√	√	√	√
Identity Data					
Description		√	√	√	√
Model				√	√
Manufacturer				√	√
Kod_Komponen_Projek_jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√

Family Category: **STRUCTURAL COLUMN**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Constrains					
Base Level			√	√	√
Top Level			√	√	√
Column Style			√	√	√
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_jkr_sit				√	√
Kod_DAK_Lokasi_jkr_sit				√	√

Family Category: **STRUCTURAL COLUMN**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Model Properties					
Projek_Asal_jkr_stt			√	√	√
No_Lukisan_Elektronik_jkr_stt			√	√	√
No_Lukisan_Butiran_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_Jkr_stt	√	√	√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_stx			√	√	√
Nota_jkr_stx			√	√	√
Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Note: Data Information is required when using Decorative Column and finishes that does not involve structural analysis.

Family Category: **STRUCTURAL COLUMN**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Data					
No_Pesanan_Rasmi_Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh_Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
Alamat_Kontraktor_jkr_six				√	√
Alamat_Pembekal_jkr_six				√	√
ID_Komponen_jkr_sit					√
Kod_DAK_Lokasi_jkr_sit				√	√

ID_Komponen_jkr_sit information is required after project hand over

Family Category: STRUCTURAL FRAMING

Family Category: **STRUCTURAL FRAMING**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Komponen_IBS_jkr_sty			√	√	√
Kod_Jenis_jkr_stt			√	√	√
MS1064_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_ stx			√	√	√
Graphic					
Warna_Kelulusan_PBT_ jkr_stt			√	√	√
Material & Finishes					
Kod_Kemasan_jkr_stt			√	√	√
Kod_Bahan_jkr_stt			√	√	√
Bahan_jkr_stm			√	√	√
Bahan_jkr_stt			√	√	√
Kemasan_jkr_stt			√	√	√
Kemasan_jkr_stm			√	√	√
Dimension					
b			√	√	√
h			√	√	√
Identity Data					
Description			√	√	√
Model				√	√
Manufacturer				√	√
Kod_Komponen_Projek_ jkr_stt			√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√
Model Properties					
Projek_Asal_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_ Jkr_stt			√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_ stx			√	√	√
Nota_jkr_stx			√	√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_ stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_ stt				√	√

Family Category: **STRUCTURAL FRAMING**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Constrains					
Start Offset Level			√	√	√
End Offset Level			√	√	√
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_ jkr_sit				√	√
Data					
No_Pesanan_Rasmi_ Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_ jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh_Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_ sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
Alamat_Kontraktor_jkr_ six				√	√
Alamat_Pembekal_jkr_ six				√	√
ID_Komponen_jkr_sit					√
Kod_DAK_Lokasi_jkr_sit				√	√

Note: Data Information is required when using Decorative Structural Framing and finishes that does not involve structural analysis.

Family Category: STRUCTURAL STIFFENERS

Family Category: STRUCTURAL STIFFENERS					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Komponen_IBS_jkr_sty			√	√	√
Kod_Jenis_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Material & Finishes					
Kod_Bahan_jkr_stt			√	√	√
Bahan_jkr_stm			√	√	√
Bahan_jkr_stt			√	√	√
Dimensions					
Panjang_jkr_stl			√	√	√
Lebar_jkr_stl			√	√	√
Tinggi_jkr_stl			√	√	√
Identity Data					
Description			√	√	√
Kod_Komponen_Projek_jkr_stt			√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√
Model Properties					
Projek_Asal_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_Jkr_stt			√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_stx			√	√	√
Nota_jkr_stx			√	√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Family Category: STRUCTURAL STIFFENERS					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Constrains					
Offset			√	√	√
Workplane			√	√	√
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_jkr_sit				√	√

Family Category: STRUCTURAL TRUSSES

Family Category: **STRUCTURAL TRUSSES**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Komponen_IBS_jkr_sty			√	√	√
Kod_Jenis_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_stx			√	√	√
Material & Finishes					
Kod_Kemasan_jkr_stt			√	√	√
Kod_Bahan_jkr_stt			√	√	√
Bahan_jkr_stm			√	√	√
Bahan_jkr_stt			√	√	√
Kemasan_jkr_stt			√	√	√
Kemasan_jkr_stm			√	√	√
Dimension					
b			√	√	√
h			√	√	√
Identity Data					
Description			√	√	√
Model				√	√
Manufacturer				√	√
Kod_Komponen_Projek_jkr_stt			√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√
Model Properties					
Projek_Asal_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_Jkr_stt			√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_stx			√	√	√
Nota_jkr_stx			√	√	√
Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Family Category: **STRUCTURAL TRUSSES**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Constrains					
Start Level Offset			√	√	√
End Level Offset			√	√	√
Dimension					
Truss Height			√	√	√
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Butiran_APK_jkr_six				√	√
Tarikh_Kelulusan_APK_jkr_sit				√	√
Data					
No_Pesanan_Rasmi_Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh_Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
Alamat_Kontraktor_jkr_six				√	√
Alamat_Pembekal_jkr_six				√	√
ID_Komponen_jkr_sit					√
Kod_DAK_Lokasi_jkr_sit				√	√

Note: Data Information is required for finishes and when using Decorative Structural Truss that does not involve structural analysis.

ID_Komponen_jkr_sit information is required after project hand over.

Family Category: WALL

Family Category: **WALL**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Structure		√	√	√	√
Function			√	√	√
Komponen_Bomba_jkr_sty			√	√	√
Komponen_IBS_jkr_sty			√	√	√
Kod_Jenis_jkr_stt			√	√	√
MS1064_jkr_sty			√	√	√
Kod_Tinggi_jkr_stt			√	√	√
Kod_Kedudukan_jkr_stt			√	√	√
Ruang_Berkaitan_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Material & Finishes					
Kod_Bahan_jkr_stt			√	√	√
Kod_Kemasan_Luar_jkr_stt			√	√	√
Kod_Kemasan_Dalam_jkr_stt			√	√	√
Bahan_jkr_stt			√	√	√
Kemasan_Dalam_jkr_stt			√	√	√
Kemasan_Luar_jkr_stt			√	√	√
Lapisan_Kalis_Air_jkr_stx			√	√	√
Lapisan_Kalis_Air_jkr_sty			√	√	√

Family Category: **WAL**L					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Constrains					
Location Line		√	√	√	√
Base Constrain		√	√	√	√
Base Offset		√	√	√	√
Top Constraint		√	√	√	√
Top Offset		√	√	√	√
Room Bounding		√	√	√	√
Graphics					
Warna_Kelulusan_PBT_sit			√	√	√
Identity Data					
Komen_jkr_six		√	√	√	√
Phasing					
Tarikh_Kelulusan_APK_jkr_sit				√	√
Butiran_APK_jkr_six				√	√

Family Category: **WALL**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Identity Data					
Model				√	√
Manufacturer				√	√
Description		√	√	√	√
Kod_Komponen_Projek_jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√
Model Properties					
Projek_Asal_jkr_stt			√	√	√
No_Lukisan_Elektronik_jkr_stt			√	√	√
No_Lukisan_Butiran_jkr_stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Kod_Komponen_Sumber_Jkr_stt	√	√	√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_stx			√	√	√
Nota_jkr_stx			√	√	√
Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√

Family Category: **WALL**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Data					
No_Pesanan_Rasmi_Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_jkr_sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh_Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
Alamat_Kontraktor_jkr_six				√	√
Alamat_Pembekal_jkr_six				√	√
ID_Komponen_jkr_stt					√
Kod_DAK_Lokasi_jkr_sit				√	√

Note: Data Information is required for finishes and when using Wall that does not involve structural analysis.

ID_Komponen_jkr_sit information is required after project hand over.

Family Category: WINDOWS

Family Category: **WINDOWS**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Construction					
Wall Closure			√	√	√
Kod_Jenis_jkr_stt			√	√	√
Kod_Rekabentuk_jkr_stt			√	√	√
Kod_Kekisi_jkr_stt			√	√	√
Kekisi_jkr_stt			√	√	√
Kekisi_jkr_sty		√	√	√	√
MS1064_jkr_sty			√	√	√
Kod_Saiz_jkr_stt			√	√	√
Kod_Tinggi_jkr_stt			√	√	√
Kod_Kedudukan_jkr_stt			√	√	√
Ruang_Berkaitan_jkr_stt			√	√	√
Kod_Ciri_Komponen_jkr_stx	√	√	√	√	√
Graphic					
Warna_Kelulusan_PBT_jkr_stt			√	√	√
Material & Finishes					
Kaca_jkr_stt			√	√	√
Panel_jkr_stm			√	√	√
Kod_Bingkai_jkr_stt			√	√	√
Bingkai_jkr_stm			√	√	√
Kaca_jkr_stm			√	√	√
Hood_jkr_stm			√	√	√
Bingkai_jkr_stt			√	√	√
Kod_Panel_jkr_stt					
Kod_Kaca_jkr_stt			√	√	√
Hood_jkr_stt					
Kemasan_Bingkai_jkr_stt			√	√	√
Kemasan_Panel_jkr_stt			√	√	√
Panel_jkr_stt			√	√	√

Family Category: **WINDOWS**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Constraints					
Level		√	√	√	√
Sill Height		√	√	√	√
Construction					
Kumpulan_Ironmongery_jkr_sii			√	√	√
Ironmongery_jkr_six			√	√	√
Identity Data					
Komen_jkr_six			√	√	√
Phasing					
Tarikh_Kelulusan_APK_jkr_sit				√	√
Butiran_APK_jkr_six				√	√

Family Category: **WINDOWS**					
Parameter (Architectural)	Level of Development				
Type	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Dimensions					
Width		√	√	√	√
Height		√	√	√	√
Identity Data					
Description		√	√	√	√
Model				√	√
Manufacturer				√	√
Kod_Komponen_Projek_ jkr_stt	√	√	√	√	√
Spesifikasi_jkr_stx			√	√	√
Huraian_BQ_jkr_stx			√	√	√
Model Properties					
No_Lukisan_Butiran_jkr_ stt			√	√	√
No_Lukisan_Elektronik_jkr _stt			√	√	√
Nota_Family_jkr_stx			√	√	√
Projek_Asal_jkr_stt			√	√	√
Kod_Komponen_Sumber_ Jkr_stt	√	√	√	√	√
General					
Panduan_Revit_jkr_stx			√	√	√
Panduan_Rekabentuk_jkr_ stx			√	√	√
Nota_jkr_stx			√	√	√
Data					
Sub_Sistem_jkr_stt				√	√
Kod_DAK_Komponen_jkr_ stt				√	√
Sistem_jkr_stt				√	√
Jenama_jkr_stt				√	√
Kaedah_Pemasangan_jkr_ stt				√	√
Visibility					
Petunjuk_jkr_sty			√	√	√
Others					
Default Sill Height			√	√	√

Family Category: **WINDOWS**					
Parameter (Architectural)	Level of Development				
Instance	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
Data					
No_Pesanan_Rasmi_ Kerajaan_jkr_sit				√	√
Tarikh_Waranti_Tamat_jkr _sit				√	√
Kos_Perolehan_jkr_sic				√	√
Tarikh_Dipasang_jkr_sit				√	√
No_Tel_Kontraktor_jkr_sit				√	√
No_Tel_Pembekal_jkr_sit				√	√
Jangka_Hayat_jkr_sit				√	√
Pembekal_jkr_sit				√	√
Kontraktor_jkr_sit				√	√
No_Siri_jkr_sit				√	√
Alamat_Kontraktor_jkr_six				√	√
Alamat_Pembekal_jkr_six				√	√
ID_Komponen_jkr_sit					√
Kod_DAK_Lokasi_jkr_sit				√	√
Other					
Head Height		√	√	√	√

Note: ID_Komponen_jkr_sit information is required after project hand over.

GLOSSARY AND ABBREVIATIONS

A. GLOSSARY

i) Sustainable Architecture

The art of designing physical objects and the built environment to comply with the principles of economic, social and ecological sustainability. An integrated approach to design in creating a sustainable building. Describes environmentally-conscious design techniques in the field of architecture.

ii) Prescribed activities

There are a total of nineteen (19) categories of prescribed activities which include:

a) agriculture
b) airport
c) drainage
d) irrigation
e) land reclamation
f) fisheries
g) forestry
h) housing
i) industry
j) railways
k) transportation
l) resort and recreation development
m) waste treatment and disposal
n) water supply projects

iii) Environmentally Sensitive Areas (ESA)

Malaysian National Physical Plan (NPP) identified three classes of Environmentally Sensitive Areas (ESA). These are:

a) ESA Rank 1: All protected areas, potential protected areas, wetlands, turtle landing sites, catchment areas of existing and proposed dams and areas with contours above 1000 metres above mean sea level (a.m.s.l).
b) ESA Rank 2: All other forests, wildlife corridors, buffer zones around ESA Rank 1 areas and areas with contours between 300-1000 metres a.m.s.l.
c) ESA Rank 3: All marine park islands, buffer zones around ESA Rank 2 areas, catchment areas for water intakes, areas for groundwater extraction (well

fields), areas with erosion risk greater than 150 ton/ha./year, areas experiencing critical or significant coastal erosion and areas between 150-300 metres a.m.s.l.

iv) Detailed Environmental Impact Assessment (DEIA)

A study which is required for ten different types of projects which include:

a) steel mill
b) pulp and paper mill
c) cement plant
d) coal-fired power plant
e) dams (hydroelectric and water supply)
f) coastal land reclamation
g) incinerators (scheduled wastes and solid wastes, solid wastes disposal sites
h) projects involving land clearance where more than 50% of the area has slope>25°)
i) logging (>500 hectares).

It is to be noted that for projects in Sabah and Sarawak, specific local legislations pertaining to EIA requirements need to be adhered to.

v) Industrialised Building System (IBS)

An Industrialised Building System (IBS) is defined as a construction technique that involves industrialised production of building elements or components as well as erection and assembly of these elements into a desired building structure through mechanical means. The components manufactured in a controlled environment (on or off site), transported, positioned and assembled into structure with minimal additional site work.

The aims of IBS are to reduce dependency on foreign labour, lower wastages, less site materials, cleaner environment, better quality, neater and safer construction sites, faster project completion as well as lower total construction cost.

All IBS elements/components shall be locally manufactured or fabricated.

vi) Composite wood and agrifiber products

Particleboard, medium density fibreboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores.

B. ABBREVIATIONS

AHU	Air Handling Unit
JBPM	Jabatan Bomba & Penyelamat Malaysia
BIM	*Building Information Modelling*
BPEP	BIM Project Execution Plan
BS	British Standards
C&S	Civil & Structure
CCC	Certificate Compliance & Completion
CGSO	Chief Government Security Office Malaysia
CIDB	Construction Industry Development Board
CPC	Certificate Practical Completion
DOE	Department of Environment Malaysia
DLP	Defect Liability Period
EIA	Environmental Impact Assessment
EN	European Standard
EMP	Environmental Management Plan
EMS	Environmental Management System
EPU	Economic Planning Unit
FRP	Fire Rated Period
GI	Galvanized Iron
GPPPP	Garis Panduan Perancangan Pemuliharan dan Pembangunan
GPSS	Green Product Scoring System
IBS	Industrialized Building System
ISO	International Organization for Standardization
JKR	Jabatan Kerja Raya
KPKR	Ketua Pengarah Kerja Raya Malaysia
JPPN	Jawatan kuasa Perancang Pembangunan Negara
KPKT	Kementerian Perumahan & Kerajaan Tempatan
KPTG/PTG	Ketua Pengarah Tanah dan Galian
LAM	Lembaga Arkitek Malaysia
LSG	Light Solar Gain
M&E	Mechanical & Electrical
MOF	Ministry of Finance Malaysia
MS	Malaysian Standards
OKU	Disable People
pHJKR	Penarafan Hijau JKR
PD	Project Director
PSP	Principal Submitting Person

PU	Polyurethane
PUR	Polyurethane Reinforced
PVC	Polyvinyl Chloride
RC	Reinforced Concrete
RWDP	Rain Water Down Pipe
SDBA	Street, Drainage and Building Act 1974 (Act 133)
TCPA	Town and Country Planning Act 1976 (Act 172)
UBBL	Uniform Building By Law
uPVC	Unplasticied Polyvinyl Chloride
VOC	Volatile organic compounds
VIP	Very Important Person
W.C.	Water Closet